

# Five-Year Review Report

## Second Five-Year Review Report for Missouri Electric Works Site Cape Girardeau Cape Girardeau County, Missouri

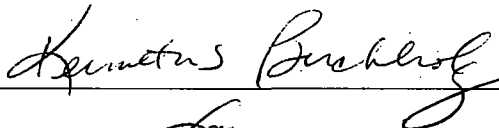
August 2009

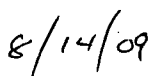
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## List of Abbreviations

Abbreviations	Definition
1,1,1-TCA	1,1,1-Trichloroethane
1,1-DCA	1,1-Dichloroethane
1,1-DCE	1,1-Dichloroethene
1,2-DCE	1,2-Dichloroethene
1,2,4-TCB	1,2,4-Trichlorobenzene
1,2-DCB	1,2-Dichlorobenzene
1,3-DCB	1,3-Dichlorobenzene
1,4-DCB	1,4-Dichlorobenzene
ARAR	Applicable or Relevant and Appropriate Requirement
ATSDR	Agency for Toxic Substances and Disease Registry
BGS	Below Ground Surface
BHHRA	Baseline Human Health Risk Assessment
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CIC	Community Involvement Coordinator
COC	Contaminants of Concern
DOJ	Department of Justice
EBD	Enhanced Bio-Degradation
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FS	Feasibility Study
IC	Institutional Control
LTTD	Low Temperature Thermal Desorber
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal



<b>Abbreviations</b>	<b>Definition</b>
MDNR	Missouri Department of Natural Resources
MEW	Missouri Electric Works
MEWSC	Missouri Electric Works Steering Committee
MEWSTD	Missouri Electric Works Site Trust Donors
MNA	Monitored Natural Attenuation
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PCB	Polynuclear Biphenyl "Polychlorinated" per previous FYR
PCE	Perchloroethene
PIC	Product of Incomplete Combustion
PPB	Parts per Billion
PPM	Parts per Million
PRP	Potentially Responsible Party
RA	Remedial Action
RAO	Remedial Action Objective
RD	Remedial Design
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SVOCs	Semi-Volatile Organic Compounds
TBCs	To Be Considereds
TCE	Trichloroethene
TI	Technical Impracticability
TSCA	Toxic Substances Control Act
USGS	United States Geological Survey
VOC	Volatile Organic Compound

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## **Executive Summary**

Three operable units (OUs) have been defined for the Missouri Electric Works (MEW) Superfund site (Site) that includes OU 1 (soils), OU 2 (groundwater), and OU 3 (wetlands). The remedy for OU 1 has been completed and the protectiveness determination for this OU is the basis for this review. Protectiveness determinations cannot be made for OU 2 since the remedy has not been implemented nor for OU 3 where a remedy has not been selected.

The soil remedy for the Site included excavation, processing, and treatment of Polychlorinated Biphenyl (PCB) contaminated soils using thermal desorption technology. Successful treatment of the soil was confirmed through soil sample analyses, and the treated soil was used to backfill the excavated areas. The entire area was capped with a contaminant-free soil. The upper one foot of the cap was enriched to support vegetation. The soil remedy was complete with the acceptance by the Environmental Protection Agency (EPA) of the Soil Remedial Action Report during September 2000. The trigger for this five-year review is the start of remedial action (RA) on-site construction, which occurred June 7, 1999.

The groundwater portion of the remedy at the Site has not been implemented. After the Record of Decision (ROD) was signed in 1990 (1990 ROD), new hydrogeologic information was obtained by the Missouri Electric Works Steering Committee (MEWSC). This new information indicated that there was a possibility that PCBs were present in the groundwater at depths greater than three hundred (300+) feet. Solution features were encountered at depths of 110, 220, and 315 feet below ground surface (bgs). The solution cavities at depths of 220 and 315 feet bgs were mud-filled; the mud and water were contaminated with PCBs. A focused Remedial Investigation/Feasibility Study (RI/FS) for groundwater has been conducted for the Site.

EPA issued a second ROD in 2005 (2005 ROD) which addressed two groundwater regimes that had been impacted by contamination from the Site. Groundwater monitoring and institutional controls (ICs) were selected as components of the remedy for the contaminated groundwater in the fractured, karst bedrock. Active restoration of this groundwater unit was determined by EPA to be technically impracticable from an engineering perspective, so a Technical Impracticability (TI) waiver for meeting the groundwater cleanup levels (maximum contaminant levels or MCLs) was invoked by EPA in the 2005 ROD. Monitoring, ICs, and Monitored Natural Attenuation (MNA) were selected as components of the remedy for the contaminated groundwater in the alluvium south of the MEW property. These remedies have not yet been implemented. Special Notice Letters seeking the performance of this work were issued by EPA to potentially responsible parties (PRPs) on March 4, 2009. An offer to perform this work, under certain conditions, was received from the Missouri Electric Works Steering Committee (MEWSC) on May 6, 2009. Consent Decree (CD) negotiations are currently underway. The MEWSC has requested that all remaining work be addressed through one settlement document. Accordingly, the CD currently being negotiated includes all remaining work: the remedial design/remedial action (RD/RA) for groundwater, and the remedial investigation/feasibility study (RI/FS), and the RD/RA for the wetlands area.

While there are no current unacceptable human exposures to contaminated groundwater in the immediate area, the threats posed by the contaminated groundwater have not yet been addressed. The groundwater components of the 1990 ROD have been superseded by the 2005 ROD. The 2005 ROD has not been implemented; therefore, protectiveness has been achieved only for the soils. The potential threat to ecological systems or the environment will be assessed as part of the work to be performed pursuant to the CD that is currently being negotiated.

The remedy at OU 1 is protective of human health and the environment. All exposure pathways and risks are controlled and the remedy continues to function as intended by the 1990 ROD and 1994 Explanation of Significant Differences (ESD). Exposure assumptions, cleanup values, toxicity data, and the Remedial Action Objectives (RAOs) remain valid.

The remedy at OU 2 is expected to be protective of human health and the environment upon completion, and in the interim, exposure pathways that could result in unacceptable risks are being controlled.

A protectiveness determination of the remedy at OU 3 cannot be made until further information is obtained. Further information will be obtained through the collection of data to determine the ecological risks for the Site. It is expected that these actions will take approximately three years to complete; at that time a protectiveness determination will be made.

## Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name(from WasteLAN): <b>Missouri Electric Works</b>		
EPA ID (from WasteLAN): <b>MOD980965982</b>		
Region: <b>7</b>	State: <b>MO</b>	City/County: <b>Cape Girardeau/Cape Girardeau</b>
SITE STATUS		
NPL status: <input checked="" type="checkbox"/> Final <input type="checkbox"/> Deleted <input type="checkbox"/> Other (specify)		
Remediation status (choose all that apply): <div style="text-align: center;"> <input checked="" type="checkbox"/> Under Construction    <input checked="" type="checkbox"/> Operating    <input type="checkbox"/> Complete </div>		
Multiple OUs? * <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Construction Complete Date: ____/____/____
Has site been put into reuse? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
REVIEW STATUS		
Lead agency: <input checked="" type="checkbox"/> EPA <input type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency		
Author name: Daniel Kellerman and Pauletta R. France-Isetts		
Author title: Remedial Project Manager		Author affiliation: U.S. EPA, Region 7
Review period: ** <b>12/20/2008 to 06/30/2009</b>		
Date(s) of site inspection: <b>02/11/2009 &amp; 03/18/2009</b>		
Types of review: <input checked="" type="checkbox"/> Post-SARA <input type="checkbox"/> Pre-SARA <input type="checkbox"/> NPL-Removal Only <input type="checkbox"/> Non-NPL Remedial Action Site <input type="checkbox"/> NPL State/Tribe-lead <input type="checkbox"/> Regional Discretion		
Review number: <input type="checkbox"/> 1 (first) <input checked="" type="checkbox"/> 2(second) <input type="checkbox"/> 3 (third) <input type="checkbox"/> Other(specify)		
Triggering Action: <input type="checkbox"/> Action RA On-site Construction at OU #1 <input type="checkbox"/> Actual RA Start at OU # ____ <input type="checkbox"/> Construction Completion <input checked="" type="checkbox"/> Previous Five-year Review Report <input type="checkbox"/> Other (specify)		
Triggering action date (from WasteLAN): <b>June 7, 1999 (on-site construction OU 1), 1<sup>st</sup> Five Year Review August 2004</b>		
Due date (five years after triggering action date): <b>June 7, 2009</b>		

\* [OU refers to operable unit.]

\*\* [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

## **Five-Year Review Summary Form, cont'd.**

### **Issues:**

ICs addressing potential groundwater exposures have not been placed on the Site; this effort is currently being negotiated as part of the work under the new CD.

A wetland area south of the MEW property has been impacted by contamination from the Site. Additional investigation is necessary so that an Ecological Risk Assessment can be performed.

The groundwater monitoring data collected in the fractured bedrock and alluvium during the focused groundwater design investigation indicates that there are two contaminant plumes; however, they do not appear to be migrating. Continued monitoring of the groundwater is needed to verify this.

Groundwater parameter data has been collected from the alluvium and indicates that natural attenuation is occurring. Continued monitoring of the alluvium groundwater, both for contaminants and those parameters necessary for natural attenuation, needs to be performed.

Maintenance to secure the property, replacing monitor well locks, removing compromising vegetation, and maintaining security fencing must be conducted.

### **Recommendations and Follow-up Actions:**

ICs for groundwater, both fractured bedrock and alluvium, need to be established. The ICs are identified as part of the work to be performed pursuant to the CD that is currently being negotiated.

A focused remedial investigation and ecological risk assessment are needed for the wetland area. A ROD for the wetland (OU 3) will be needed after the data is available to identify any actions that may be required for protectiveness of the environment. These efforts are identified as part of the work to be performed pursuant to the CD that is currently being negotiated.

Another set of monitor wells is needed in the wetland area to verify that the extent of the contaminant plume has been adequately identified. Installation of up to three wells is identified as part of the work to be performed pursuant to the CD that is currently being negotiated.

Regular monitoring of both the fractured bedrock and alluvium groundwater is needed to verify that the plumes are not migrating and that contaminant concentrations are stable or decreasing. Groundwater monitoring, at regular specified intervals, is identified as part of the work to be performed pursuant to the CD that is currently being negotiated.

Additional groundwater data will be collected to evaluate whether parameters necessary for natural attenuation continue to exist in the alluvium. This work is a part of the effort to be performed pursuant to the CD currently being negotiated.

Implement security measures and maintain the integrity of the monitoring wells and fencing.

**Protectiveness Statement(s):**

The remedy at OU 1 is protective of human health and the environment. All exposure pathways and risks are controlled and the remedy continues to function as intended by the 1990 ROD and 1994 ESD. Exposure assumptions, cleanup values, toxicity data, and the RAOs remain valid.

The remedy at OU 2 is expected to be protective of human health and the environment upon completion, and in the interim, exposure pathways that could result in unacceptable risks are being controlled.

A protectiveness determination of the remedy at OU 3 cannot be made until further information is obtained. Further information will be obtained through the collection of data to determine the ecological risks for the Site. It is expected that these actions will take approximately three years to complete; at that time a protectiveness determination will be made.

**Other Comments:**

EPA issued a new ROD for OU2 in 2005. EPA and the MEWSC are currently negotiating a CD that will implement the remedies identified in the 2005 ROD. The groundwater remedy identified in the 1990 ROD is no longer applicable and is superseded by the 2005 ROD. Ecological risk will be addressed through the CD that is currently being negotiated.

**Missouri Electric Works Superfund Site  
Cape Girardeau, Missouri  
First Five-Year Review Report**

**I. Introduction**

The purpose of the Five-Year Review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues, if any, found during the review and identify recommendations to address such issues.

The EPA is preparing this Five-Year Review report pursuant to Section 121(c) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Section 121(c) provides:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each 5 years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section 104 or 106 [of CERCLA], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

The EPA has interpreted this requirement further in the NCP; 40 CFR. § 300.430(f)(4)(ii) provides:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after initiation of the selected remedial action.

EPA, Region 7, has conducted this Five-Year Review of the remedy implemented at the Site in Cape Girardeau, Missouri. This review was conducted by Remedial Project Managers (RPM) Daniel Kellerman and Pauletta France-Isetts for the entire Site from December 2008 through June 2009. This report documents the results of the review.



This is the second Five-Year Review for the Site. The triggering action for this statutory review is completion of the first Five Year Review and the start of RA on-site construction which occurred on June 7, 1999. The Five-Year Review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure.

Three operable units are designated for this Site to address Chemicals of Concern (COCs) which include PCBs, Volatile Organic Compounds (VOCs) and Semi-Volatile Aromatic Compounds: OU 1 addresses COCs in the shallow subsurface soils on the MEW property; OU 2 addresses COCs in the fractured bedrock and alluvial groundwater systems; OU 3 addresses the ecological impact to soil, sediment, and biota of the wetland area adjacent to the MEW property. The remedy for OU 1 is the only OU being assessed for protectiveness in this review since remedies for OU 2 and OU 3 have not been selected and/or implemented.

## II. Site Chronology

Table 1 – Chronology of Site Events

Event	Date
Site discovery	10/25/1984
EPA-lead Expanded Site Investigation conducted	05/01/1987
PRP search initiated	01/15/1988
PRP lead RI/FS initiated	12/31/1988
Site listed on the NPL	02/21/1990
Remedial Investigation (RI) report submitted to EPA	06/04/1990
Record of Decision (ROD) signed	09/28/1990
Special Notice letters sent	12/21/1990
Good Faith Offer received	03/04/1991
PRPs perform post-ROD groundwater investigation with EPA oversight	07/06/1991
RD/RA Consent Decree negotiations conclude	09/19/1991
Consent Decree transmitted to all parties for signature	09/26/1991

Event	Date
Signed Consent Decree sent to DOJ for lodging in federal court	12/30/1991
PRPs submit groundwater investigation report	01/09/1992
Additional PRPs identified	01/16/1992
EPA "approves" groundwater report after review	03/19/1992
Unidentified person(s) dumps tons of lime on-site (additional material will require treatment)	05/1992
OSC samples materials dumped on-site by persons unknown Civil investigator attempts to identify person(s) responsible	05/1992
Late parties signed Consent Decree	06/15/1992
DOJ files complaint, lodges Consent Decree	06/29/1992
District Court enters Consent Decree	08/29/1994
<i>De minimis</i> parties make payments to MEW trust and Superfund	09/1994
Settling Defendants retain Construction Management Contractor	09/1994
Appeal filed by Intervenor	10/28/1994
Settling Defendants submit information on thermal desorbers and request EPA to review and change ROD	10/1994
McLaren-Hart petitions EPA HQ for National TSCA permit demonstration at the Site	10/1994
Availability session in Cape Girardeau to let public know of possible inclusion of thermal desorbers	12/14/1994
Explanation of Significant Differences to ROD issued by EPA	02/01/1995
Pilot study using innovative low temperature/high vacuum thermal desorber unit	05/15/1995
8 <sup>th</sup> Circuit Court of Appeals remands Consent Decree to District Court	08/1995
McLaren-Hart submits report on demonstration test at the Site	06/1996
DOJ lodges Consent Decree (second time)	06/29/1996

<b>Event</b>	<b>Date</b>
District court re-enters Consent Decree	08/14/1996
Intervenors appeal re-entry of Consent Decree	10/07/1996
8 <sup>th</sup> Circuit Court of Appeals re-affirms District Court's entry of Consent Decree	12/1997
Request for Proposal for soils contractor issued	05/1998
Williams Environmental Services selected as soils contractor	08/25/1998
Preliminary remedial design (RD) submitted	10/01/1998
Pre-final RD and draft Remedial Action Work Plan (RAWP) submitted	12/22/1998
100% RD and revised RAWP submitted	05/19/1999
RA on-site construction start	06/07/1999
Groundwater RI/FS start (OU 2)	06/12/2000
Final Inspection	09/19/2000
Remedial Action Report (OU 1) final approval	09/29/2000
Draft Baseline Human Health Risk Assessment (OU 2) submitted	07/28/2004
Draft Groundwater RI submitted (OU 2)	08/02/2004
Draft Groundwater FS submitted (OU 2)	07/30/2004
First Five-Year Review	09/2004
Final Groundwater RI submitted	02/11/2005
Ecological Risk Screening Evaluation	06/2005
Final Groundwater FS submitted (OU 2)	07/05/2005
Baseline Human Health Risk Assessment (OU 2) approval	07/05/2005
Public Meeting for 2005 ROD	09/08/2005

Event	Date
Record of Decision (OU 2) signed	09/28/2005
Expanded Ecological Risk Screening Evaluation	06/2006
Long-Term Monitoring Optimization	05/03/2006
Erection of protective fence with signage around wetland pond	02/20/2007
Special Notice Letters for OU 2 and OU 3 issued	03/2009
Good Faith Offer from MEWSTD	05/2009
Consent Decree Negotiations start for CD (OU 2 RD/RA; OU 3 RI/FS & RD/RA)	06/2009

### III. Background

#### Physical Characteristics

Cape Girardeau, Missouri, is a thriving community of about 37,000 permanent residents. Cape Girardeau is located in southeastern Missouri along the Mississippi River. It is a regional hub for education, commerce, and medical care. Southeast Missouri State University is located in Cape Girardeau. It is estimated that approximately 90,000 additional people visit Cape Girardeau daily to work, go to school, obtain medical care, or shop.

MEW operated on a 6.4 acre tract adjacent to U.S. Highway 61 (South Kingshighway) in Cape Girardeau. Figure 1 indicates the location of the Site within the city limits of Cape Girardeau, Missouri. The Site includes all areas which became contaminated with polychlorinated biphenyls (PCBs) originating from MEW's operations. Figure 2 indicates the extent of soil contamination that comprised OU1. Figure 3 indicates all areas that have been impacted by the contamination from the Site. The Site is located in a predominately commercial/industrial area of Cape Girardeau. The area surrounding the Site has experienced significant development since the early 1990s when the Site was listed on the National Priorities List (NPL).

The Site is situated approximately 1.6 miles west of the Mississippi River. It is located in the hills adjacent to the west valley wall of the Mississippi River flood plain. Intermittent run-off channels emanate from the north, south, and east boundaries of the Site and eventually drain into the Cape LaCroix Creek which is located 0.7 mile east of the Site. The Cape LaCroix Creek flows 1.1 miles to the southeast and enters the Mississippi River. The property is bounded on the north by retail and warehouse properties; on the south by a residence, commercial storage and a construction company; and on the east by a warehouse. A wetland is located approximately 700 feet south of the MEW property. Figure 4 indicates the approximate location of the wetland in relation to the MEW property and the city of Cape Girardeau.

## **Land and Resource Use**

MEW purchased the property in 1952. Prior to that, it is believed that the land was used for agricultural purposes. MEW operated an electrical repair, service, and resell business from the location from 1954 to 1992. The facility discontinued operations in 1992 when the principal of MEW died.

In 2008, Mr. C.J. Morrill, president of Contrend, Inc., acquired the property through a foreclosure sale. According to Mr. Morrill, plans for the property include improvement and redevelopment for commercial uses.

The current land use for the surrounding area is predominantly commercial. Soccer fields are located to the east of the Site. New business construction continues near the Site. It is expected that the land use in the area will not change significantly. In establishing cleanup requirements for the Site, EPA considered the theoretical possibility of an on-site residence. The thermally treated soils were used to backfill the excavations at the Site. After soils treatment was complete, a vegetative cover was established to protect the Site from erosion.

## **History of Contamination**

MEW serviced, repaired, reconditioned, and salvaged electrical equipment from 1954 to 1992. Electrical equipment handled during this time consisted of oil-filled electrical transformers, electric motors, electrical equipment controls, and oil-filled switches. PCBs, first manufactured in the 1920s, have excellent fire-retardant properties. PCBs were often added to the dielectric fluid in electrical equipment to minimize the potential for fires. The Toxic Substance Control Act (TSCA) of 1978 banned the future manufacture of PCBs and required that electrical equipment containing more than 500 parts per million (ppm) PCB be removed from service. This regulation resulted from studies which indicated that PCBs are a probable human carcinogen; they are extremely stable in the environment (they do not degrade), and they bio-accumulate in the food chain. The products of incomplete combustion of PCBs are dioxins and furans.

During its operational history, MEW reportedly recycled materials from old units, selling copper wire, and reusing the dielectric fluids from the transformers. The salvaged transformer oil was filtered through Fuller's earth for reuse. An estimated 90 percent of the transformer oil was recycled. According to business records obtained from MEW, more than 16,000 transformers were repaired or scrapped at the Site during its time of operation. The total amount of transformer oil that was not recycled was estimated to be 28,000 gallons. Information gathered during interviews of former employees indicates that the majority of the nonrecycled oil was disposed of on the Site. In 1984, approximately 5,000 gallons of waste oil was removed by a contractor after the TSCA inspection by the Missouri Department of Natural Resources (MDNR).

Industrial solvents were used to clean the electrical equipment being repaired or serviced. Solvents were reused until they were no longer effective. Spills and disposal of spent solvents on the MEW property were described by past employees during EPA-conducted interviews. The MEW and adjacent properties have been found to be contaminated with PCBs.

## Initial Response

Environmental concerns pertaining to the Site first arose as a result of a 1984 TSCA inspection of the Site by MDNR. PCB-contaminated soils and inappropriate storage of over 100 55-gallon drums of PCB-contaminated oils were identified. EPA performed additional investigations to characterize the amount of contamination between 1985 and 1988. EPA issued an administrative order requiring that the owner/operator of the Site no longer handle any oil-filled electrical equipment with PCB concentrations greater than 2 ppm, that erosion barriers be placed in all drainage features to minimize the amount of PCB contamination migrating off-site via storm water runoff, and that vegetables grown on the Site not be sold or given away to anyone outside of the Site owner's immediate family.

The Site was proposed for inclusion on the National Priorities List (NPL) on June 24, 1988, and finalized on the NPL on February 21, 1990. Former MEW customers were informed of their potential liability beginning in June 1988. A steering committee of former customers known as the Missouri Electric Works Steering Committee (MEWSC) was formed. The MEWSC performed a Remedial Investigation/Feasibility Study (RI/FS) during 1989 and 1990. The RI/FS was made available to the public during June 1990. The Proposed Plan identifying EPA's preferred remedy was presented to the public during August 1990, starting the period for public comment.

A design RI/FS for the groundwater was required pursuant to the Consent Decree for OU 1 (soils). The Missouri Electric Work Site Trust Donors (MEWSTD) performed the soil RD/RA and the groundwater RI/FS. The RI began in 2000 and continued through 2004. The RI/FS for the groundwater was made available to the public in a Proposed Plan during August 2005, starting the period for public comment.

## Basis for Taking Action

### Contaminants

Hazardous substances that have been released to the Site in each media include:

#### Soil

PCBs  
methylene chloride  
trichloroethene  
trichloroethane  
chlorobenzene

#### Groundwater

1,1-dichloroethane	1,1,1-trichloroethane
1,2-dichloroethene (total)	1,1-dichloroethene
chlorobenzene	1,2,4-trichlorobenzene
trichloroethene	1,2-dichlorobenzene
tetrachloroethene	1,3-dichlorobenzene
benzene	1,4-dichlorobenzene
PCBs	

#### Sediment

PCBs

#### Air

PCBs

The risks to human health and the environment represented by the PCB contamination of the soils were evaluated assuming that the Site could be used for recreational, residential, or occupational use. Exposure routes included inhalation of PCB-contaminated dust or PCB vapors, ingestion of PCB-contaminated soil, or dermal contact with PCB-contamination. The health risks represented by the PCB contamination at the Site are unacceptable. The carcinogenic risk represented by the PCB soil contamination at the Site for the current use scenario was estimated to be  $1 \times 10^{-3}$ , or one additional cancer for every 1,000 persons. The carcinogenic risk represented by PCB contamination at the Site for future residential use of the Site was  $1 \times 10^{-2}$ , or one additional cancer for every 100 persons.

A Human Health Risk Assessment (HHRA) of the Site was performed by the MEWSC during 1990. The purpose of the HHRA was to assess the risks posed to human health by the contaminants at the Site. Contaminants at the Site included: PCB-contaminated soils and sediments, VOC-contaminated soils and sediments, and VOC contamination of the groundwater.

The HHRA evaluated both current and future exposure situations. For purposes of the HHRA, it was assumed that no remedial action would be performed at the Site in order to evaluate the possible future risks posed by the contamination. The following routes of exposure were evaluated: ingestion of PCB-contaminated and VOC-contaminated soil/sediment by children and adults; inhalation of PCB-contaminated and VOC-contaminated dust particles/vapors by children and adults; dermal (skin) exposure to PCB-contaminated and VOC-contaminated soil/sediment; and ingestion of VOC-contaminated groundwater by children and adults (future use only). It was assumed that these exposures would occur during the following activities: recreational, residential, and occupational (adults only).

The HHRA indicated that contamination at the Site presented an unacceptable risk to human health and the environment. The principal threat from the Site was due to human exposure to the PCB-contaminated soils. The analyses were based on "most probable case" and "worst case" exposure scenarios. Potential risks associated with exposure to groundwater are attributed to the presence of chlorinated compounds that exist at concentrations that exceed state MCLs.

A Baseline Human Health Risk Assessment (BHHRA) was performed by the Settling Defendants during 2004 which specifically evaluated the groundwater contaminants associated with MEW activities. Organic chemicals of potential concern (COPCs) were selected from all compounds analyzed in groundwater samples from the Site. COPCs were identified by comparing the maximum concentrations detected with screening toxicity values. A total of 52 COPCs were retained and evaluated in the BHHRA. The COPCs are identified in the following table.

## Chemicals of Potential Concern (COPCs)

Detected Organics	Undetected Organics	
1,1-Dichloroethane	1,1,2,2-Tetrachloroethane	Benzo(k)fluoranthene
1,2,4-Trichlorobenzene	1,1,2-Trichloroethane	Bis(2-Chloroisopropyl) Ether
1,2-Dichloroethene Total	1,2-Dichloroethane	Carbon Tetrachloride
1,3-Dichlorobenzene	1,2-Dichloropropane	Chlorodibromomethane
1,4-Dichlorobenzene	2,4,6-Trichlorophenol	Dibenzo(a,h)Anthracene
2-Chlorophenol	2,4-Dinitrotoluene	Dibenzofuran
Aroclor-1260	2,6-Dinitrotoluene	Hexachloro-1,3-Butadiene
Benzene	3,3-Dichlorobenzidine	Hexachlorobenzene
Bis(2-Chloroethyl) Ether	4,6-Dinitro-2-Methyl Phenol	Indeno(1,2,3-cd)Pyrene
Bis(2-ethylhexyl)phthalate	Aroclor 1016	2-Methylnaphthalene
Bromodichloromethane	Aroclor-1221	Nitrobenzene
Chlorobenzene	Aroclor-1232	Pentachlorophenol
Chloroform	Aroclor-1242	Vinyl Chloride
Naphthalene	Aroclor-1248	Bis (2-Chloroethoxy) Methane*
N-Nitrosodi-n-propylamine	Aroclor-1254	4-Bromophenyl Phenyl Ether*
Tetrachlorethene	Benzo(a)anthracene	4-Chlorophenyl Phenyl Ether*
Trichloroethene	Benzo(a)pyrene	4-Chloro-3-Methylphenol*
	Benzo(b)fluoranthene	

\* Quantitative evaluation of the risks associated with these chemicals is not possible due to the absence of available data. These chemicals have not been included in the risk calculations.

Pathways through which populations could potentially become exposed were evaluated. These pathways include: 1) inhalation of the COPCs; 2) ingestion of the COPCs; and 3) dermal (skin) contact with the COPCs. Modeling of groundwater flow was performed for the fractured bedrock and the alluvium. For purposes of the BHHRA, it was assumed that no remedial work would be performed at the Site. This was done so that possible future risks posed by the contamination could be evaluated.

The analyses performed indicated that groundwater impacted by Site contamination presents an unacceptable risk to human health. The calculated human health risks are the result of chemicals released to the environment during the operations of MEW.

## IV. Remedial Actions

### Remedy Selection

The 1990 ROD for the Site was issued by EPA on September 28, 1990. Remedial Action Objectives (RAOs) were developed as a result of data collected during the Remedial Investigation (RI) to aid in the development and screening of remedial technology alternatives to be considered in the 1990 ROD. EPA's national goal for the Superfund program is to select remedies that will be protective of human health, and the environment that will maintain protection over time, and that will minimize untreated waste. In establishing remedial goals for the Site, EPA considered applicable or relevant and appropriate requirements (ARARs) specific to the contaminants of concern; the HHRA; Maximum Contaminant Levels (MCLs) and Maximum Contaminant Level Goals (MCLGs) established under the Safe Drinking Water Act; and EPA guidance and policy, specifically the TSCA PCB Spill Cleanup Policy, 40 CFR part 761.



### Source Control Response Objectives

- Minimize the migration of contaminants from Site soils.
- Reduce risks to human health by preventing direct contact with and ingestion of contaminants in Site soils.
- Minimize the migration of contaminants from the Site to the adjacent wetland.

### Management of Response Objectives

- Eliminate or minimize the threat posed to human health and the environment by preventing exposure to soil, air, and sediment contaminants.
- Prevent further migration of soil contamination beyond the then current Site boundaries.
- Restore contaminated groundwater to state of Missouri ARARs, which are considered to be protective of human health and the environment, within a reasonable period of time.

The major components of the source control remedy selected in the 1990 ROD included the following:

1. Preparation of the Site will be performed by clearing trees and vegetation in the area where the incinerator is to be placed.
2. Excavation and on-site incineration of all soils with PCB concentrations in excess of 10 ppm to a depth of four (4) feet and 100 ppm at depths greater than four (4) feet. Excavated soils will be consolidated on-site with provisions to minimize migration of the contaminated materials.
3. Mobilization and set-up of the incinerator at the Site.
4. Conduct trial burn(s) to ensure the operational capabilities of the incinerator.
5. Monitor continuously incinerator feed rates. Frequent monitoring of emissions from the incinerator, both ash and gases, to document compliance with destruction efficiencies and air emissions standards. Testing of the ash residuals from the treatment process will be performed to identify leaching characteristics, to identify the compounds within the ash and to verify that the ash, contains less than 2 ppm PCB.
6. Backfill excavated areas using treated soils, after analytical tests confirm that treatment standards are met.
7. Demobilization of the incinerator from Site when treatment of PCB-contaminated soils is complete.
8. Restoration and revegetation of the Site.
9. Impose institutional controls, such as deed restrictions and/or zoning restrictions, to limit use of the Site to industrial or commercial purposes.

The major components of the migration management remedy selected in the 1990 ROD included (these components were superseded by the remedial action decision made in the 2005 ROD):

1. Perform additional investigation of the hydro-geologic regime in the vicinity of the Site to identify the vertical extent of contamination and confirm the presence or absence of a continuous aquiclude within the upper 200-300 feet of the bedrock.
2. Perform pump tests to determine the flow rates and hydraulic conductivity of the aquifer to gather additional data necessary for the design.
3. Design the extraction well network, including well locations, pump sizes, pumping frequency, location and sizes of connecting piping.
4. Sample water extracted during the pump tests for identification of the contaminants and associated concentrations present in the groundwater.
5. Extract and treat groundwater utilizing an extraction well network and temporary storage followed by removal of volatile organic compounds using an air-stripper with gas phase carbon adsorption from the air stream.
6. Perform Five-Year Reviews to assess Site condition, contaminant distributions, and any associated Site hazards.

An Explanation of Significant Differences (ESD) to the ROD was issued by EPA on February 1, 1995. Technologies (thermal desorption) capable of effectively dealing with the contamination at the Site had been developed and demonstrated successfully. The MEWSC provided information supporting the ESD as a focused feasibility study in October 1994. The EPA reviewed the information and concurred that thermal desorption was a viable remedial alternative. The EPA notified the public of the proposed change, conducted a meeting in Cape Girardeau, Missouri, during December 1994, and issued the ESD. The primary changes documented in the ESD were:

- Changing on-site incineration to on-site thermal treatment.
- Defining on-site thermal treatment to be either incineration or thermal desorption.

The 2005 ROD was issued on September 28, 2005. Two distinct groundwater regimes were identified during the RI: groundwater in fractured bedrock and groundwater in alluvium underlying the wetland area. The EPA's national goal for the Superfund program is to select remedies that will be protective of human health and the environment, that will maintain protection over time, and that will minimize untreated waste. The NCP identifies the remedial action expectations for contaminated groundwater at Superfund sites as:

EPA expects to return usable groundwaters to their beneficial uses whenever practicable, within a time-frame that is reasonable given the particular circumstances of the site. When restoration of groundwater to beneficial uses

is not practicable, EPA expects to prevent further migration of the plume, prevent exposure to the contaminated groundwater and evaluate further risk reduction.” 40 CFR § 300.430(a)(1)(iii)(F).

Based on this expectation, the following general goals are applicable to groundwater remedial actions:

- Prevent exposure to contaminated groundwater which might pose an unacceptable risk
- Prevent or minimize further migration of the contaminant plume
- Prevent or minimize further migration of COCs from source materials to groundwater
- Return groundwater to expected beneficial uses whenever practicable

RAOs define the extent of cleanup required to protect human health and the environment and to comply with applicable or relevant and appropriate requirements (ARARs). ARARs are categorized as action-specific, chemical-specific, and location-specific. The ARARs for the Site, divided by category, are provided as Attachments 2 and 3. RAOs will identify the environmental media, the COCs, exposure pathways, and potential receptors and target cleanup levels (TCLs) for each pathway/receptor.

The following are RAOs for groundwater at the Site:

- Prevent exposure of receptors, both in the upland and wetland areas, to fractured bedrock and alluvial groundwater when COC concentrations exceed TCLs
- Prevent future use of the aquifer underlying the Site as a source of drinking water
- Assess and manage the migration of COCs in the fractured bedrock and alluvial groundwater
- Assess and manage the migration of COCs from fractured bedrock into the alluvium

Two groundwater regimes have been impacted by contamination from the Site. The impacted groundwater is in the fractured bedrock in the upland area and in the alluvium in the wetland area. A remedy has been identified for each groundwater regime.

As discussed above, EPA has determined that, due to the hydrogeological conditions at the Site, it is technically impracticable from an engineering perspective to comply with the relevant and appropriate requirement of achieving MCLs in remediating the groundwater; and accordingly, a TI waiver of this requirement was invoked by EPA in the 2005 ROD.

The migration management remedy selected for the fractured bedrock groundwater in the 2005 ROD includes the major components of:

- ICs
- wellhead treatment (where appropriate)
- long-term groundwater monitoring

The TI waiver was needed due to the highly variable and fractured nature of the bedrock in the Upland Area of the Site. Since it is not technically practicable from an engineering perspective to remediate the fractured bedrock groundwater, attainment within the fractured bedrock groundwater area of the Safe Drinking Water Act (SDWA) MCLs (40 CFR §141.11-141.14), revised MCLs (40 CFR §141.61 - 141.62), and non-zero Maximum Contaminant Level Goals (MCLGs) (40 CFR § 141.60 -141.51) are waived for 1,1,1 -TCA; TCE; PCE; 1,1-DCA; 1,1-DCE; 1,2-DCE; benzene; chlorobenzene; 1,2,4-TCB; 1,2-DCB; 1,3-DCB; 1,4-DCB; and PCBs.

ICs will be implemented or imposed as appropriate to prevent exposure to the contaminated groundwater. The primary IC is expected to be proprietary in nature, i.e., an Environmental Covenant that complies with, and is enforceable under, Missouri's Environmental Covenants Act (sections 260.1000-.1039, RSMo). Although EPA believes that an Environmental Covenant is all that would be necessary to protect human health and the environment from contaminated groundwater at the Site, other ICs that might be considered for use at the Site may include the designation of the area of groundwater contamination as a "special use" area by MDNR's Division of Environmental Quality, ordinances limiting resource use, and/or public information. Monitoring of groundwater would be performed. This would be accomplished by obtaining groundwater samples from bedrock wells and performing laboratory analysis on the samples for COCs.

The migration management remedy selected for the alluvium groundwater in the 2005 ROD includes the major components of:

- ICs
- wellhead treatment
- long-term groundwater monitoring
- injection of EBD agents into the alluvial groundwater (with a contingent MNA remedy, if groundwater conditions allow)

The primary IC is expected to be proprietary in nature, i.e., an Environmental Covenant that complies with, and is enforceable under, Missouri's Environmental Covenants Act (sections 260.1000-.1039, RSMo). Although EPA believes that an Environmental Covenant is all that would be necessary to protect human health and the environment from contaminated groundwater at the Site, other ICs that might be considered for use at the Site may include the designation of the area of groundwater contamination as a "special use" area by MDNR's Division of Environmental Quality, ordinances limiting resource use, and/or public information. Monitoring of groundwater would be performed. This would be accomplished by obtaining

groundwater samples from bedrock wells and performing laboratory analysis on the samples for COCs. Agents to accelerate natural biological processes that degrade or break-down COCs would be injected into the alluvial groundwater. Installation of injection wells will be required.

### **Contingent Alluvium Technology**

During June 2005, the analyses performed on alluvial groundwater samples were expanded to include parameters that are used to determine whether or not degradation of chemicals was naturally occurring. These parameters were monitored for one year. Evaluation of the data indicated that the alluvial groundwater can support natural attenuation. Therefore, it was determined that injection of compounds into the groundwater is not required to attain RAOs.

### **Remedy Implementation**

The CD signed by the EPA, the MDNR, 175 Settling Defendants, and 3 Federal Agencies was referred to the Department of Justice (DOJ) on December 30, 1991. One hundred thirty-four (134) of the Settling Defendants were *de minimis* parties that elected to cash-out their liability with regards to either soil or soil and groundwater response actions. The CD was lodged in the Federal District Court for the Eastern District of Missouri, Southeastern Division, in June 1992. It was approved or entered by the Federal District Court during August 1994. The CD entry was appealed by a group of non-settling former MEW customers during October 1994. The 8<sup>th</sup> Circuit Court of Appeals reversed the entry of the CD and remanded the CD to the Federal District Court during August 1995 for further deliberation; the CD was approved a second time by the Federal District Court on August 14, 1996. The same group of former customers again appealed the CD entry. The 8<sup>th</sup> Circuit Court of Appeals confirmed entry of the CD during December 1997.

The Remedial Design (RD) was conducted in conformance with the soils response actions identified in the ROD as modified by the ESD. The RD was conditionally approved by EPA on March 25, 1999.

The MEWSC requested that EPA allow it to further investigate groundwater contamination during late 1990. The purpose of the investigation was to prove the presence of a confining layer (shale) that would inhibit the downward migration of contaminants in the groundwater. EPA agreed to the investigation. Drilling for the new well began in January 1991. A pilot hole was drilled to about 220 feet to verify the condition of the limestone bedrock. This hole was continuously cored within the bedrock; the quality of the rock was good. The location of the new monitoring well (MW-11) was approximately 10 feet southwest of the pilot boring. While drilling, a solution feature was detected at a depth of about 110 feet below ground surface (bgs). Casing was seated in the rock below the void; the boring grouted and redrilled using a smaller diameter drill bit. A second, larger solution feature about 10 feet high was detected at a depth of about 220 ft. bgs. This void was mud-filled; the mud was sampled and PCB contamination of the mud and water was detected. Again the casing was seated in the rock below the void; the boring grouted and re-drilled using a smaller diameter drill bit (this is

referred to as telescoping the hole). A third large solution feature was encountered at a depth of about 315 ft. bgs. This void was also mud-filled. Several thousand gallons of the mud-slurry material within the hole was pumped and then sampled. PCB contamination of the sediment-water mixture and water (the solids were removed using a centrifuge) was detected. The hole was telescoped again. The hole was advanced to a depth of 405 ft. bgs. Groundwater was collected and sampled. PCBs were detected at 2 parts per billion (ppb). (The MCL for PCBs in groundwater is 0.5 ppb.)

The new groundwater information resulted in the identification of a significant data-gap. As a result, the CD provided for the cleanup of the PCB-contaminated soils, in accordance with the ROD, for a focused investigation and feasibility study of the groundwater (additional investigation of the hydro-geologic regime in the vicinity of the Site was to be performed), and treatment of the contaminated groundwater within about 70 feet of the ground surface using pump and treat technology. Groundwater response actions identified in the 1990 ROD were not included in the CD due to the lack of information needed for design and cost analysis purposes.

The work identified in the CD took place in two phases: the first was thermal treatment of the PCB-contaminated soils and the second was the focused groundwater study. After several years delay due to legal proceedings, the contract for thermal treatment of the soils was awarded on August 25, 1998. The remedial design was conditionally approved on March 25, 1999. On-Site mobilization, clearing, and grubbing efforts began on June 7, 1999. Thermal treatment of the PCB-contaminated soils was completed on July 25, 2000. The work for the soils operable unit (OU) was finished with the approval of the Remedial Action Report on September 29, 2000. The major components of the soils RA were:

- Clearing and grubbing of the Site.
- Construction of concrete pad for the Low Temperature Thermal Desorption (LTTD) unit.
- Mobilization and set-up of the LTTD unit.
- Excavation of PCB-contaminated soils.
- Screening/processing of PCB-contaminated soils in preparation or thermal desorption.
- LTTD trial runs (process had to meet specified destruction criteria and not create products of incomplete combustion [PICs]).
- Review of LTTD trial run(s) data.
- Approval to treat soils using parameters established during trial runs.
- Excavation of deep PCB-contamination (up to 25 ft. bgs) - all soils with PCB concentrations greater than 100 ppm removed from the Site. (sinkholes were detected on-site, with one being at the location of monitoring wells MW-3, MW-5 and MW-11).
- Modification of excavation plan to leave habitat for pair of nesting red-tailed hawks.
- Production treatment of PCB-contaminated soils.
- Backfill and regrading of Site.
- Revegetation of the Site.
- Pre-final/Final Inspection.

The pre-final inspection concluded that the soils RA had been conducted and completed in accordance with the soils remedial design plans and specifications; a punch list of additional work items was not needed.

The second phase of the work performed pursuant to the CD consisted of the groundwater investigation and feasibility study. Since the decision was made during the soils RA that all PCBs in excess of 100 ppm would be removed, the soils RA acted as a source removal for the groundwater contamination. Upon completion of the thermal desorption activities, the existing groundwater monitoring wells were sampled on a quarterly basis for about two years. During this time, noninvasive investigations were performed to better define the joint patterns within the bedrock. The purpose of the noninvasive work was an attempt to get data to formulate a model of the underlying bedrock. This was made extremely difficult by the fact that the bedrock below the Site is karst; solution features have been carved in the bedrock by the groundwater. It is very difficult, if not impossible, to track contaminants within karst bedrock. A model of the bedrock was created. Additional monitoring wells were installed at those locations most likely to be contaminated. These wells, along with the original wells, were monitored for four quarters. Groundwater data was analyzed and the decision was made that additional monitoring wells were needed near the northern edge of the wetland area. Three sets of wells were installed. All monitoring wells were sampled quarterly for another year. Chlorinated compounds were detected in the samples from the wetland wells. Two more sets of wells were installed further south and west in the wetland area. A third set of wells were planned to monitor groundwater east of the wetland area. These wells were not installed due to lack of alluvium in this area. A focused remedial investigation and feasibility study was then submitted to EPA.

EPA and the state of Missouri have determined that all work identified in the CD has been substantially performed. A Consent Decree (1:95CV0041) with Missouri Electric Works, Inc. and the estate of Richard Giles required that a notice be attached to the property deed for the MEW real estate. The deed notice was to restrict the use of the property. Only commercial and industrial uses are to be allowed, with no food handling or child care activities. The estate of Richard Giles filed the Consent Decree with the Recorder of Deeds, Cape Girardeau County on June 16, 2005. EPA issued a separate Record of Decision for groundwater in 2005 (2005 ROD).

### **System Operation/Operation and Maintenance**

Representatives of the MEWSTD conducted the monitoring and maintenance activities with regard to the vegetative cover over the treated soils. About a year after constructing the cap, a Site visit was made to observe the condition of the cap, identify any erosional features, and assess the success of vegetating the cap. Several erosion rills were identified and filled, new grass seed was planted, and erosion barriers (rock-filled gabions) were erected along the eastern-most edge of the Site.

No long-term operation and maintenance activities were required in the CD. There are no operation and maintenance activities being performed.

## **V. Progress Since the Last Five-Year Review**

### **First Five Year Review Issues and Recommendations**

Issue	Recommendations/Follow-up Actions
Continuing erosion along the eastern perimeter of the Site	Annual inspections; repair of slope if necessary
Institutional controls not placed with regards to soils	No action
Institutional controls not placed with regards to groundwater	Have institutional controls placed on property to prohibit groundwater use
Ecological risk assessment not conducted for wetland area south of MEW facility	Prepare an Ecological Risk Assessment after performing a focused RI in the wetland area
Insufficient groundwater monitoring to determine whether or not plume is migrating	Monitor groundwater, especially in wetland, for an extended period to determine migration
Insufficient groundwater parameter data to determine whether natural attenuation is occurring	Monitor groundwater for an extended period of time to evaluate potential for attenuation

### **First Five Year Review Protectiveness Statement**

The soil remedy is protective of human health. The groundwater portion of the remedy has not been implemented. The groundwater could present a risk to human health through ingestion or inhalation. New standards have been instituted for ecological protectiveness since the ROD was written. Additional work needs to be performed to determine whether or not there is an ecological risk.

Additional sampling and monitoring of the groundwater will be performed to evaluate the migration of the contaminant plume below the wetland area and to evaluate the potential of natural attenuation of the contaminants of concern. An investigation will be performed to gather the data necessary for the Ecological Risk Assessment. A determination will be made after the Ecological Risk Assessment is complete as to whether or not additional actions will be required for protectiveness of the environment.



Since the first Five-Year Review for the Site, the following have occurred:

- A groundwater RI/FS has been completed.
- The 2005 Record of Decision has been issued.
- An investigation of the ability of the alluvium groundwater to support MNA has been completed.
- An Ecological Risk Screening Evaluation was completed in June 2005.
- An Expanded Ecological Risk Screening Evaluation was completed in June 2006.
- Fencing and signage of the wetland pond area has been completed.
- Special Notice Letters have been issued for the RD/RA for OU 2 and the RI/FS and RD/RA for OU 3.
- A Good Faith offer has been received from the MEWSTD.
- CD negotiations for work at OU 2 and OU 3 have commenced.

## **VI. Five-Year Review Process**

### **Administrative Components**

Members of the MEWSTD and the community were notified of the Five-Year Review during February 2009. The MEW Five-Year Review was performed by Daniel Kellerman and Pauletta France-Isetts, EPA Remedial Project Managers. Don Van Dyke, Project Manager, Missouri Department of Natural Resources, assisted in the review as the representative for the support agency.

The review schedule components included the following:

- Community involvement
- Document review
- Data review
- Site inspection
- Local interviews
- Five-Year Review report development and review

These efforts were performed from December 2008 through June 2009.

### **Community Involvement**

Activities to involve the community in the Five-Year Review were initiated with a meeting in January 2009 between the RPM Kellerman and the Community Involvement Coordinator (CIC) for the Site. A notice was sent to the "Southeast Missourian" in Cape Girardeau (the local newspaper), that a Five-Year Review was to be conducted; this notice was published on March 1, 2009. A fact sheet was sent to Federal and State of Missouri Legislators on February 27, 2009. The fact sheet was also mailed to 348 interested parties from an updated mailing list. The Fact Sheet invited the recipients to submit any comments to EPA. Following execution by EPA, the Five-Year Review report will be available to the public at the Cape Girardeau Public Library and the EPA Region 7 office.

## Document Review

This Five-Year Review consisted of a review of relevant documents including the Remedial Action report, groundwater monitoring data, and ecological screening assessments. Applicable cleanup standards (as listed in the 1990 ROD and 2005 ROD) were also reviewed. Relevant policy and guidance documents for risks posed by PCBs, both human health and ecological, were also reviewed. The documents reviewed are listed in Attachment 1.

## Data Review

### Remedial Action Report

All soils contaminated with PCBs at concentrations in excess of 10 ppm were to be excavated and treated. Approximately 38,000 tons of PCB-contaminated soil were excavated and thermally treated during the soil remedial action. Confirmation composite samples were collected within 143 50' x 50' grids. The average PCB concentration for the confirmation samples was 1.6 ppm; the mean PCB concentration was 0.7 ppm.

### Groundwater Investigation

Groundwater monitoring, as part of the focused groundwater investigation, was conducted at the Site from June 2000 through November 2004. No new groundwater monitoring wells were installed at the Site for approximately two years following the soil remedial action. The purpose of the monitoring was to gather data sufficient to evaluate the impact of the PCB source removal on groundwater quality.

Groundwater samples were analyzed for the following compounds:

- 1,1,1-Trichloroethane (1,1,1-TCA)
- Trichlorethene (TCE)
- Perchlorethene (PCE)
- 1,1-Dichloroethane (1,1-DCA)
- 1,1-Dichloroethene (1,1-DCE)
- 1,2-Dichloroethene (1,2-DCE)
- Benzene
- Chlorobenzene
- Toluene
- Chloroform
- 1,2,4-Trichlorobenzene (1,2,4-TCB)
- 1,2-Dichlorobenzene (1,2-DCB), 1
- ,3-Dichlorobenzene (1,3-DCB)
- 1,4-Dichlorobenzene (1,4-DCB)
- Butyl benzyl phthalate

- Di-n-butyl phthalate
- Bis(2-ethylhexyl phthalate
- PCB unfiltered
- PCBs filtered

Where detected, the concentrations of these parameters have decreased or remained constant indicating that the majority of the source material was successfully removed. The following contaminants were detected at or above the MCL as promulgated under the federal Safe Drinking Water Act: TCE, PCE, Benzene, Chlorobenzene, and PCBs (unfiltered).

### Ecological Risk Assessment Guidance

EPA issued guidance entitled "Ecological Risk Assessment and Risk Management Principles for Superfund Sites" (OSWER Directive 9285.7-28 P) on October 7, 1999. This guidance states that "as the Superfund program has matured, it has given more and more consideration to the potential effects of hazardous substances releases on ecological receptors." Information regarding the potential toxicity and bio-accumulation of PCBs in the food chain has increased significantly since the 1990 ROD.

A June 2005 Ecological Risk Screening Evaluation and a June 2006 Expanded Ecological Risk Screening Evaluation was performed at OU 3 confirming a presence of PCBs in fish and other biota associated with the pond and channel in the wetlands. Elevated concentrations of PCBs were detected in stormwater drainage ditches adjacent to the Site along Wilson Road. Ecological risk can be assumed present until such time as a remedy is implemented to address PCB-impacted sediment in the drainage channels surrounding the wetland area. All recommendations made concerning environmental risks should be considered in determining the remedy for OU 3.

### **Site Inspection**

Inspections at the Site were conducted on February 11, 2009, by the RPMs Kellerman and France-Isetts. A second inspection was conducted on March 28, 2009, by RPM Kellerman and MDNR's Project Manager. The purpose of the inspections was to evaluate the current Site conditions in reference to protectiveness of the remedies, assess the condition of the vegetative cover, evaluate the structural condition and integrity of the monitoring wells, evaluate the security of the protective fencing, observe any changes to the Site and local land use, and develop a general concept of the Site layout in reference to all work previously conducted at the Site for technical review evaluation purposes.

### MEW Property

The soil remediation area was inspected to ensure the integrity of the vegetative cover and the stability of the erosion-control features. No evidence of erosion, subsidence, or burrowing/rodent inhabitation was observed on the cover. The cover remains intact and is maintained in all locations on the upper elevations of the Site. Near the edge of the cap along the northeastern slope of the upper elevations, vegetation is lacking in the erosional features alongside the rock-filled gabions. The monitoring wells on the property all appear to be

functional although minor damage to several protective covers was observed, damage likely the result of mowing/weed-eating. Lock replacement for the wells is recommended based on the rusted condition and appearance. Trees and shrubs are growing around several wells that could result in damage to the well casing which could compromise access. Access to the property was not secured along Kingshighway but is recommended to prevent unlawful entry or dumping and to further protect the monitoring wells from trespassers. The nest of the red-tailed hawk(s) remains in place along the eastern perimeter of the Property; two hawks were observed nesting during the March 18, 2009; Site visit, each was active and quite vocal.

No institutional controls were placed on the areas addressed by the soil RA for OU 1. The soils were excavated to PCB-concentrations less than 10 ppm. The ROD identified leaving PCBs at concentrations of up to 100 ppm at depths below 4 feet. The original removal plans were reconsidered and the excavation was expanded to depths exceeding the original 4 foot destination depth to where no PCB concentrations exceeded 100 ppm; the need for institutional controls for soil contamination no longer exists.

### Wetlands

The greater wetland area is not secured other than the placement of a chain link security fence and signage intact surrounding the pond. The gate was locked and no location of physical damage to the fencing was observed other than small diameter trees which have fallen across the top of the fence along the west side. The fallen trees could represent a slight compromise to the accessibility component of the structure since the barbed-wire strands are compressed down on the top fence rail. However, no evidence of trespassing was observed.

### **Interviews**

Interviews were conducted with some parties connected to the Site. No significant problems regarding the Site were identified during the interviews.

## **VII. Technical Assessment**

### Question A: Is the remedy functioning as intended by the decision documents?

Yes.

The review of documents indicate that the soil RA is functioning as intended by the ROD and ESD. However, PCBs have been discovered in the groundwater at depth, and no RA has been taken to address the threat posed by groundwater.

The remedy for OU2 is not yet functioning. Implementation is not possible since the CD is still being negotiated. The remedy for OU3 (wetland) has not been selected. A security fence was constructed around the wetland pond to minimize potential human exposure to the aquatic life that may be contaminated with PCBs.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

Yes.

The exposure assumptions for human health remain valid. Little change has been made to the toxicity data and cleanup levels for PCBs although more data is becoming available on reproductive toxicity for PCBs now than in 1990. The RAOs for the soil cleanup remain valid and there are no known newly promulgated standards calling into question the protectiveness of the remedy.

Changes in Standards and To Be Considereds

The estimate of ecological risk has been formalized since 1990 when the 1990 ROD was issued. PCBs bio-accumulate and bio-magnify in the food chain. Screening levels for PCBs are quite low. There are no revisions, newly promulgated standards deviating from those in the ROD, or TBCs used in selecting the cleanup levels at this Site calling into question the protectiveness of the remedy.

Changes in Exposure Pathways

The exposure assumptions used to develop the soils portion of the 1990 HHRA and the 2005 BHHRA included both current and future exposures (child recreational, child residential, adult recreational, adult residential and adult worker). Land use changes at the Site and in the immediate vicinity have not affected the exposure pathways of the Site. No new human health or ecological routes of exposure or receptors have been identified, nor have any newly identified contaminants or contaminant sources. There are no known unanticipated toxic byproducts of the remedy not addressed by the OU 1 soil decisions documents. Physical Site conditions have changed little, if any. The MEW property structure remains vacant. There have been no new changes in the understanding of the Site conditions which would adversely affect the protectiveness of the remedy.

Changes in Toxicity and Other Contaminant Characteristics

Little change in the toxicity factors for the contaminants of concern or other contaminant characteristics that were used in the HHRA have occurred since the 1990 ROD. These assumptions are considered to be conservative and reasonable in evaluating the human health risk and developing human health risk-based cleanup levels. No changes to the assumptions, or the cleanup levels developed from them, are warranted to protect human health.

Changes in Risk Assessment Methods

Baseline Risk Assessment now includes human health and ecological risk assessment. Ecological risk was not estimated in 1990. Investigation of the wetland surface soils, sediments, surface water and soils within approximately four feet of the ground surface should be sampled and analyses performed to evaluate the risk, if any, to the environment posed by the contamination.

### Expected Progress Towards Meeting RAOs

The RAOs for soils have been met. Implementation of the remedy for groundwater is pending.

*Question C: Has any other information come to light that could call into question the protectiveness of the remedy?*

No.

Several karst features were detected at, near or below the Site after the 1990 ROD was issued. Two sink-holes were found; one off-site and the other near the location of MW-3, MW-5, and MW-11A. During the installation of MW-11A, subsurface voids (solution features) were encountered at depths of 110 feet bgs, 220 feet bgs, and 315 feet bgs. This information has resulted in a technical impracticability waiver (TI waiver) being selected as a remedy component in the 2005 ROD.

### Technical Assessment Summary

According to the data reviewed, the Site inspection and the interviews, the soil remedy is functioning as intended by the ROD, as modified by the ESD. The groundwater remedy has not been implemented. There have been no changes in the physical conditions of the Site that would affect the protectiveness of the soil remedy. The ARARs for soil contamination cited in the ROD have been met. There have been no changes in the toxicity factors for the contaminants of concern that were used in the HHRA. There has been no change in the standardized risk assessment methodology for human health. There has been a change in the standardized methodology for ecological risk; this could impact the protectiveness of the remedy. A groundwater RI/FS has been completed and the 2005 ROD identified the selected remedial actions. The selected remedial actions for groundwater at the Site have not been implemented; the consent decree negotiations for these efforts are on-going. Risk posed by groundwater still exists.

Potential threats to wetland populations have been indentified through biota and sediment sampling. A remedy selection is needed for OU 3 where additional data collection is necessary.

## VIII. Issues

Table 2 – Issues

Issue	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
Institutional controls for groundwater not placed	N	Y
Insufficient monitoring frequencies for groundwater: fractured bedrock and alluvium	N	Y
Ecological risk assessment not conducted for wetland area south of the MEW facility	Y	Y
Additional sediment/soil assessment needed to determine whether PCBs are present in the wetland area	Y	Y
Maintenance to secure the property, replace monitor well locks and remove compromising vegetation, and maintain security fencing	N	Y

## IX. Recommendations and Follow-up Actions

Table 3 – Recommendations and Follow-Up Actions

Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Institutional controls not placed with regards to groundwater	Implement institutional controls to prohibit well drilling in and use of groundwater	property owner(s)/ City of Cape Girardeau State of Missouri	State/ EPA	Sept. 30, 2010	N	Y
Insufficient monitoring frequencies for groundwater: fractured bedrock and alluvium	Implement schedule for groundwater monitoring (to be set forth in the Consent Decree)	PRPs	State/ EPA	Sept. 30, 2010	N	Y

Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Ecological risk assessment not conducted for wetland area south of the MEW facility	Use data obtained from wetland investigations to prepare an Ecological Risk Assessment to determine whether there is an unacceptable risk to the environment	PRPs	State/EPA	Sept. 30, 2012	Y	Y
Additional sediment/soil assessment needed to determine whether PCBs are present in the wetland area	Conduct a focused RI in the wetland area to determine the extent of PCBs	PRPs	State/EPA	Sept.30, 2011	Y	Y
Maintenance to secure the property, replace monitor well locks and remove compromising vegetation, and maintain security fencing	Implement security measures and maintain the integrity of the monitor wells and fencing	PRPs	State/EPA	Sept. 30, 2009	N	Y

## **X. Protectiveness Statement**

The remedy at OU 1 is protective of human health and the environment. All exposure pathways and risks are controlled and the remedy continues to function as intended by the 1990 ROD and 1994 ESD. Exposure assumptions, cleanup values, toxicity data, and the RAOs remain valid.

The remedy at OU 2 is expected to be protective of human health and the environment upon completion, and in the interim, exposure pathways that could result in unacceptable risks are being controlled.



A protectiveness determination of the remedy at OU 3 cannot be made at this time until further information is obtained. Further information will be obtained through the collection of data to determine the ecological risks for the Site. It is expected that these actions will take approximately three years to complete, at which time a protectiveness determination will be made.

## **XI. Next Review**

The third Five-Year Review for the Site is required by June 2014, five years from the date of this review.



- NOTES:
- 1) BASE MAP FROM USGS 7.5 MINUTE CAPE GIRARDEAU QUADRANGLE (1965, REVISED 1993).
  - 2) ALL LOCATIONS ARE APPROXIMATE.

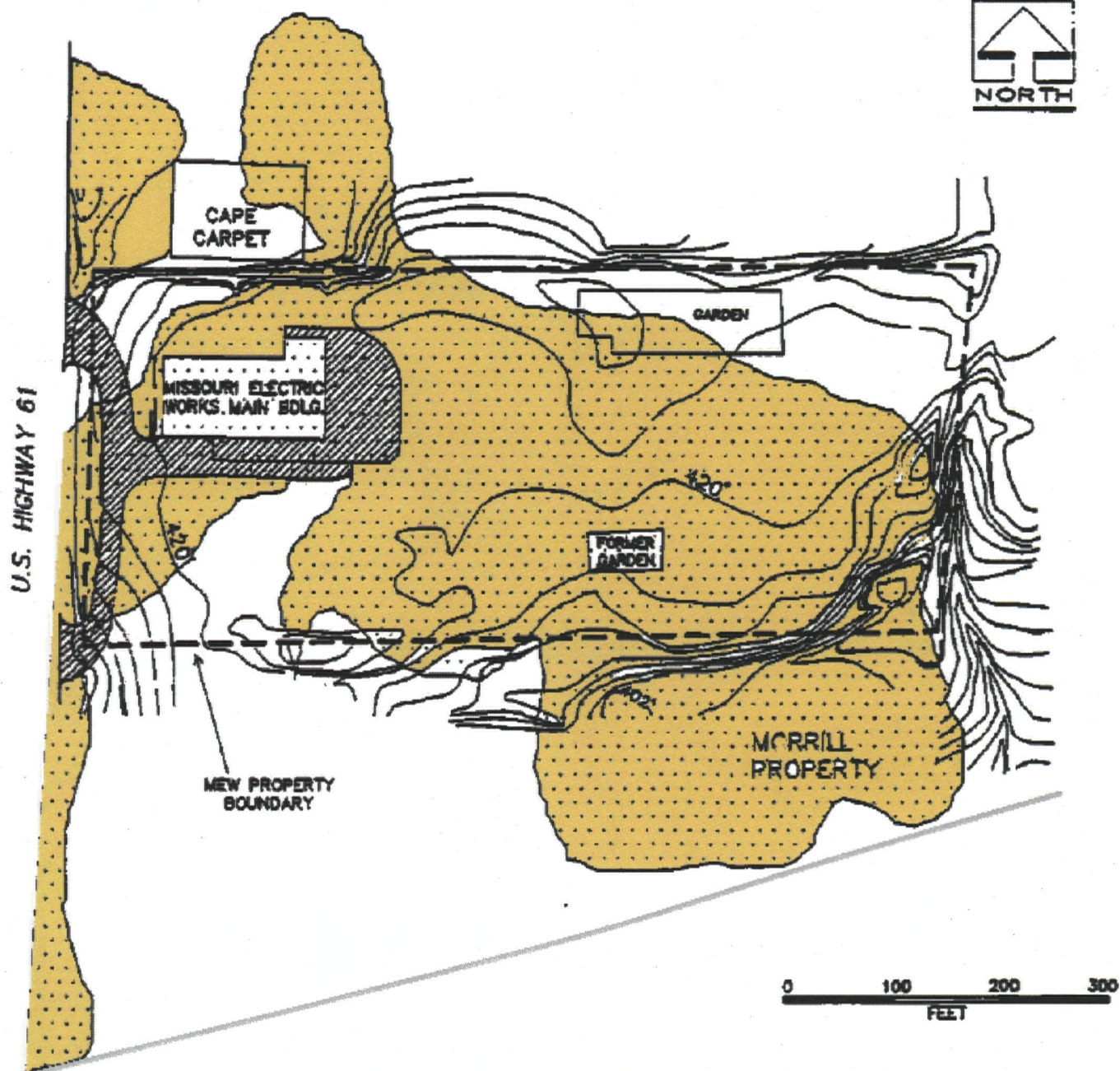
APPROXIMATE SCALE IN MILES

0 0.5 1

Missouri Electric Works Site  
Site Location Map

Figure 1



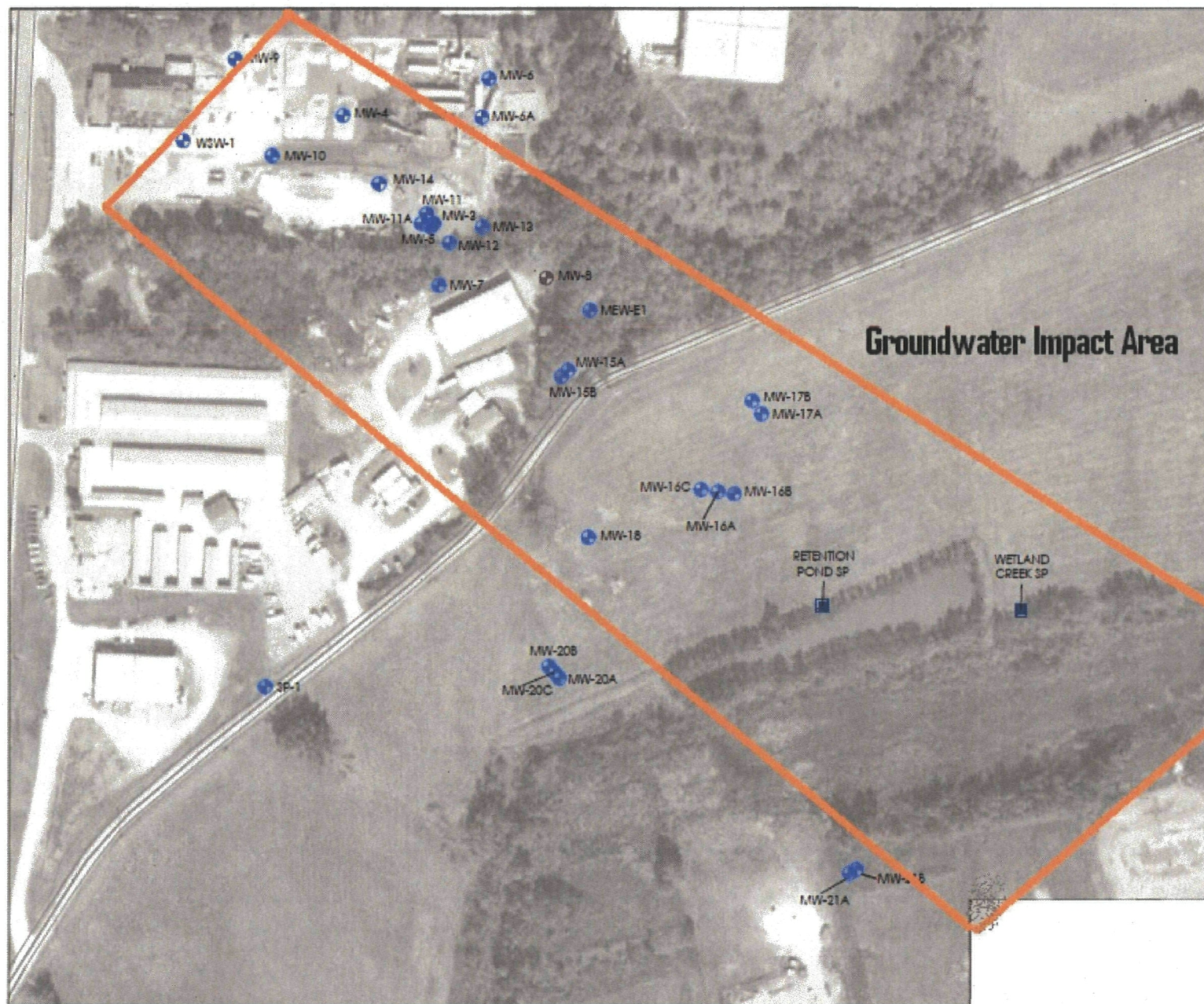


from 1990 Feasibility Study  
The Earth Technology  
Corporation

**Missouri Electric Works Site**  
**Extent of Soil Contamination (OU 1)**  
**(PCB Contaminated Soil greater than 10 ppm)**

Figure 2



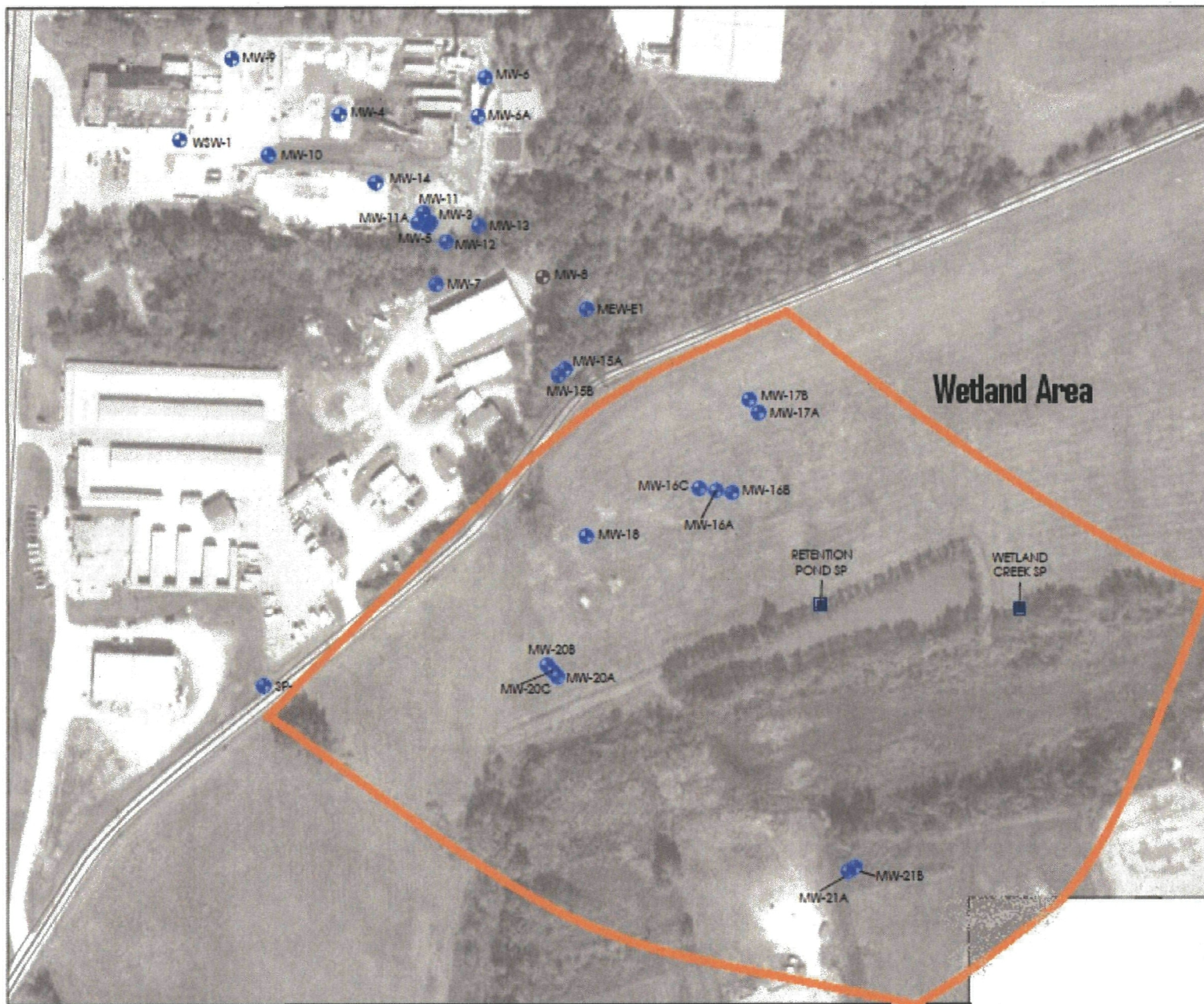


from KOMEX Remedial  
Investigation Report, 2005

**Missouri Electric Works Site**  
**Estimated Area Impacted by Groundwater Contamination**

Figure 3





from KOMEX Remedial  
Investigation Report, 2005

**Missouri Electric Works Site  
Wetland Area**

Figure 4

## **ATTACHMENT 1**

### **List of Documents Reviewed**

## List of Documents Reviewed

Remedial Investigation Report, Missouri Electric Works site, Cape Girardeau, Missouri, July 1990 (The Earth Technology Corporation)

Missouri Electric Works Record of Decision, September 1990

Missouri Electric Works Explanation of Significant Differences, February 1995 (EPA)

Preliminary Remediation Goals for Ecological Endpoints, ES/ER/TM-162/R2, August 1997

Missouri Electric Works Soils Remedial Action Report, September 2000

Comprehensive Five Year Review Guidance, OSWER No. 9335.7-03B-P, June 2001

Missouri Electric Works Quarterly Groundwater Monitoring Reports, 2001, 2002, 2003 and 2004

Alluvial Channel Subsurface Investigation, Addendum to 2003 Planning Documents, February 27, 2004 (KOMEX)

Missouri Electric Works Groundwater Remedial Investigation, July 2004

Five Year Review, August 2004 (EPA- France-Isetts)

Missouri Electric Works Second Quarter, 2005 Groundwater Monitoring Data Package, June 2005 (KOMEX)

Groundwater Flow and Transport Supplemental Modeling, July 5, 2005 (KOMEX)

Fractured Bedrock and Alluvium Groundwater Feasibility Study, July 2005 (KOMEX)

Baseline Human Health Risk Assessment Report July 2005 (KOMEX)

Multiple Tables of Groundwater Analytical Results of Detected Inorganic Compounds and Field Measurements, July 2005 (KOMEX)

Second Quarter 2005 Groundwater Monitoring Data Package, August 16, 2005 (KOMEX)

Missouri Electric Works Record of Decision, September 2005 (EPA)

MEW Expanded Ecological Risk Site Screening Evaluation Report , April 2006 (ENVIRON)

Memorandum – Verification of Wetland Pond Fence Installation, February 21, 2007 (EPA – France-Isetts)

Memorandum - Comments on PCB Clean-Up Levels at MEW, August 15, 2008 (EPA – Wooster-Brown)

Memorandum - Five Year Review Technical Assessment, April 21, 2009 (EPA – McCabe)



## **ATTACHMENT 2**

### **1990 Record of Decision ARARs**

**1990 Record of Decision  
FEDERAL CHEMICAL-SPECIFIC ARARs  
MISSOURI ELECTRIC WORKS SITE**

<b>STANDARD, REQUIREMENTS, CRITERIA, OR LIMITATION</b>	<b>CITATION</b>	<b>DESCRIPTION</b>	<b>APPLICABLE RELEVANT AND APPROPRIATE</b>	<b>COMMENT</b>
National Primary Drinking Water Standards	40 CFR Part 141	Establishes health-based standards for public water systems (maximum contaminant levels).	Yes	The MCLs for organic and inorganic contaminants are relevant and appropriate for ground water.
National Secondary Drinking Water Standards	40 CFR Part 143	Establishes welfare-based standards for public water (secondary maximum contaminant levels).	Yes	Secondary MCLs for these parameters/ contaminants may be relevant and appropriate for ground water.
Maximum Contaminant Level Goals	40 CFR Part 141	Establishes drinking water quality goals set at levels of no known or anticipated adverse health effects with an adequate margin of safety.	Yes	Proposed MCLGs for organic contaminants should be treated as "other criteria, advisories and guidance".
Water Quality Criteria	40 CFR Part 131 Quality Criteria for Water, 1986	Sets criteria for water quality based on toxicity to aquatic organisms and human health.	Yes	AWQCs may be relevant and appropriate for surface water discharges.
Releases from Solid Waste Management Units	40 CFR Part 264 Subpart F	Establishes maximum contaminant concentrations that can be released from hazardous waste units in Part 264, Subpart F.	Yes	Onsite hazardous waste management unit may be considered. Same levels as MCLs.
National Ambient Air Quality Standards	40 CFR Part 50	Establishes primary (health based) and secondary (welfare based) standards for air quality.	Yes	Standards for particulate matter must be monitored during some remedial activities.
National Emission Standards for Hazardous Air Pollutants	40 CFR Part 61	Establishes emission levels for certain hazardous air pollutants.	Yes	Standards for some chemicals may relevant and appropriate to the site.

STANDARD, REQUIREMENTS, CRITERIA, OR LIMITATION	CITATION	DESCRIPTION	APPLICABLE RELEVANT AND APPROPRIATE	COMMENT
Occupational Health and Safety Regulations	29 CFR 1910.1000 Subpart Z	Establishes permissible exposure limits for work-place exposure to many chemicals.	Yes	Listed chemicals detected on-site. Standards applicable to remedial worker exposure.
Toxic Substances Control Act (TSCA)	40 CFR Part 761	Establishes prohibitions of and requirements for the manufacture, processing, distribution in commerce, use disposal, storage and marking of PCB items. Sets forth PCB Spill Cleanup Policy.	Yes	<p>The PCB Spill Cleanup Policy (Part 761.25) is a TBC which establishes cleanup guidelines for nonregulated access areas. Part 761.60 requirements for the storage and disposal of PCB-contaminated soil and provides a basis for utilizing alternative technologies for PCB treatment.</p> <p>Part 761.70 establishes requirements for PCB incinerators, which are applicable if onsite or offsite incineration is involved.</p> <p>Part 761.75 establishes requirements for chemical waste landfills for land disposal of PCBs at concentrations of less than 500 ppm.</p>

STANDARD, REQUIREMENTS, CRITERIA, OR LIMITATION	CITATION	DESCRIPTION	APPLICABLE RELEVANT AND APPROPRIATE	COMMENT
Toxic Pollutant	40 CFR Part 129	Establishes effluent standards or prohibitions for certain toxic pollutants: aldrin/dieldrin, DDT, endrin, toxaphene, benzdine, PCBs.	No	These pollutants were not detected in ground water samples.
Identification and Listing (RCRA Waste)	40 CFR Part 261	Defines those solid wastes of Hazardous Waste which are subject to regulation as hazardous under 40 CFR Parts 262-265 and Parts 124, 270, 271.	--	Applicability of RCRA regulations to wastes found at the site is pending resolution.

**1990 Record of Decision**  
**STATE CHEMICAL-SPECIFIC ARARs**  
**MISSOURI ELECTRIC WORKS SITE**

<b>STANDARD, REQUIREMENTS, CRITERIA, OR LIMITATION</b>	<b>CITATION</b>	<b>DESCRIPTION</b>	<b>APPLICABLE RELEVANT AND APPROPRIATE</b>	<b>COMMENT</b>
Missouri Safe Drinking Water Act and Missouri Water Quality Standards	10 CSR 20-7.031	Maximum chemical contaminant levels and monitoring requirements	Yes	The requirements may be relevant and appropriate for the MEW site.
Missouri Hazardous Waste Management Regulations	10 CSR 25-7.264	Standards for owner operators of hazardous waste treatment storage, and disposal facilities.	--	Applicability of regulation to wastes found at site is pending resolution
Missouri Hazardous Waste Management Regulations	10 CSR 25-10.010	Procedures for obtaining state approval for remedial actions at abandoned or uncontrolled sites.	Yes	The requirements may be applicable for the MEW site.
Missouri Hazardous Waste Management Regulations	10 CSR 25-11.010	Procedures and requirements for managing waste oil, which are in addition to Federal requirements on used oil.	Yes	These procedures may be applicable for the MEW site if removal of non PCB-contaminated oil is involved as a remedial action.
Missouri Hazardous Waste Management Regulations	10 CSR 25-13.010	Standards for management of waste materials or waste manufactured items containing PCBs at concentrations of fifty parts per million or more.	Yes	These standards may be applicable or relevant and appropriate requirements for the MEW site.
Missouri Hazardous Waste Management Regulations	10 CSR 25-6.263	Standards for Transporters of Hazardous Waste	Yes	These requirements may be applicable for the MEW site if removal offsite of hazardous waste non-PCB oils or PCB materials.

**1990 Record of Decision  
FEDERAL LOCATION-SPECIFIC ARARS  
MISSOURI ELECTRIC WORKS SITE**

<b>STANDARD, REQUIREMENTS, CRITERIA, OR LIMITATION</b>	<b>CITATION</b>	<b>DESCRIPTION</b>	<b>APPLICABLE RELEVANT AND APPROPRIATE</b>	<b>COMMENT</b>
Protection of Wetlands	Exec. Order No. 11,990  40 CFR 6.302(a) and Appendix A	Requires Federal agencies to avoid, to the extent possible, the adverse impacts associated with the destruction or loss of wetlands and to avoid support of new construction in wetlands if a practical alternative exists.	Yes	The U.S. Army Corps of Engineers has identified a jurisdictional wetland near the MEW site.

**1990 Record of Decision**  
**STATE LOCATION-SPECIFIC ARARs**  
**MISSOURI ELECTRIC WORKS SITE**

<b>STANDARD, REQUIREMENTS, CRITERIA, OR LIMITATION</b>	<b>CITATION</b>	<b>DESCRIPTION</b>	<b>APPLICABLE RELEVANT AND APPROPRIATE</b>	<b>COMMENT</b>
Protection of Lakes and Streams	Missouri Water Quality Standards 10 CSR 20-7.031	Promulgates rules to protect quality of lakes and streams. Beneficial uses of Cape La Croix Creek listed as livestock and wildlife watering and warm water fishing.	Yes	Chemical specific ARARs are listed previously.

**1990 Record of Decision  
FEDERAL ACTION-SPECIFIC ARARs  
MISSOURI ELECTRIC WORKS SITE**

<b>STANDARD, REQUIREMENTS, CRITERIA, OR LIMITATION</b>	<b>CITATION</b>	<b>DESCRIPTION</b>	<b>APPLICABLE RELEVANT AND APPROPRIATE</b>	<b>COMMENT</b>
<b>CLEAN WATER ACT</b>	<b>33 USC 1251-1376</b>			
<b>National Pollutant Discharge Elimination System (NPDES)</b>	<b>40 CFR Part 125</b>	Requires permits for the discharge of pollutants for any point source into waters of the United States.	Yes	Permit not required for CERCLA activities; however, technical requirements for discharge must be met if onsite water treatment occurs and is discharged to surface water
<b>National Pretreatment Standards</b>	<b>40 CFR Part 403</b>	Set standards to control pollutants which pass through or interfere with treatment processes in public treatment works or which may contaminate sewage sludge.	Yes	Only if the treated ground water is discharged to a publicly owned treatment works (POTW).
<b>SOLID WASTE DISPOSAL ACT (SDWA)</b>	<b>42 USC 6901 - 6987</b>			
<b>Criteria for Classification of Solid Waste Disposal Facilities and Practices</b>	<b>40 CFR Part 257</b>	Establishes criteria for use in determining which solid waste disposal facilities and practices pose a reasonable probability of adverse effects on public health or the environment and thereby constitute prohibited open dumps.	Yes	The soil selected remedy will involve onsite disposal of incinerator ash.
<b>Standards Applicable to Generators of Hazardous Waste</b>	<b>40 CFR Part 262</b>	Establishes standards for generators of hazardous waste.	No	The selected remedies do not involve offsite transportation of either soil or ground water or treatment or disposal.



<b>STANDARD, REQUIREMENTS, CRITERIA, OR LIMITATION</b>	<b>CITATION</b>	<b>DESCRIPTION</b>	<b>APPLICABLE RELEVANT AND APPROPRIATE</b>	<b>COMMENT</b>
Standards Applicable to Transporters of Hazardous Waste	40 CFR Part 263	Establishes standards which apply to transporters of hazardous waste within the US if the transportation requires a manifest under 40 CFR Part 262	No	The selected remedies do not involve offsite transportation of hazardous wastes for treatment and/or disposal.
Contingency Plan and Emergency Procedures	Subpart D	Establishes standards which apply to transporters of hazardous waste within the US if the transportation requires a manifest under 40 CFR Part 262.	Yes	If onsite ground water treatment system produces hazardous waste.
Manifest System, Record	Subpart E	Establishes standards which apply to transporters of hazardous waste within the US if the transportation requires a manifest under 40 CFR Part 262	Yes	If the selected remedies involve the offsite transport of hazardous waste.
Use and Management of Containers	Subpart I	Establishes standards which apply to transporters of hazardous waste within the US if the transportation requires a manifest under 40 CFR Part 262	Yes	If the selected remedies involve storage of containers.
Tanks	Subpart J	Establishes standards which apply to transporters of hazardous waste within the US if the transportation requires a manifest under 40 CFR Part 262	Yes	If the selected remedies involve the use of tanks to treat or store hazardous materials.
Waste Piles	Subpart L	Establishes standards which apply to transporters of hazardous waste within the US if the transportation requires a manifest under 40 CFR Part 262	Yes	If the selected remedies would treat or store hazardous materials in piles.
Incinerators	Subpart O	Establishes standards which apply to transporters of hazardous waste within the US if the transportation requires a manifest under 40 CFR Part 262	Yes	The selected remedy for soils is onsite incineration. Also covered by CFR 761.70.

STANDARD, REQUIREMENTS, CRITERIA, OR LIMITATION	CITATION	DESCRIPTION	APPLICABLE RELEVANT AND APPROPRIATE	COMMENT
Land Disposal	40 CFR Part 268	Establishes restriction for burial of wastes and other hazardous materials.	Yes	If the selected remedies would offsite burial of contaminated soils or residues containing prohibited waste, a CERCLA waiver may be required.
OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)	29 USC 651 - 678 29 CFR Part 1910	Regulates work health and safety at hazardous waste sites.	Yes	Under 40 CFR 300.38, requirements of the Act apply to all response activities under the NCP.
HAZARDOUS MATERIALS TRANSPORTATION ACT	49 USC 1801 -1813			
Hazardous Materials Transportation Regulations	49 CFR Parts 171 - 178	Regulates transportation of hazardous materials.	Yes	If selected remedy would involve transportation of hazardous materials.
TOXIC SUBSTANCES CONTROL ACT	13 USC SEC. 2601 - 2629			
PCB Requirements	40 CFR Part 761	Establishes storage and disposal requirements for PCBs.	Yes	Treatment and disposal methodologies must meet substantive requirements set forth by 40 CFR 761.
PCB Spill Cleanup Policy	40 CFR Part 761	Establishes cleanup procedures for PCB spills.	Yes	Specifies soil cleanup levels and excavation requirements.

## **ATTACHMENT 3**

### **2005 Record of Decision ARARs**

**2005 Record of Decision**  
**Potential Chemical Specific ARARs and TBCs**

<b>Authority</b>	<b>Requirement</b>	<b>Status</b>	<b>Synopsis of Requirement</b>	<b>Consideration in the FS</b>
<b>Federal Regulatory Requirements</b>	Safe Drinking Water Act (SDWA) – Maximum Contaminant Levels (MCLs) (40 CFR §141.11 - 141.14). Revised MCLs (40 CFR §141.61 – 141.62) and non-zero Maximum Contaminant Level Goals (MCLGs) (40 CFR §141.50 – 141.51).	<b>Applicable</b>	MCLs have been promulgated for a number of common organic and inorganic contaminants to regulate the concentration of contaminants public drinking water supply systems. MCLs are applicable because Site groundwater is a potential drinking water supply.	MCLs are used to determine TCLs for groundwater.
	National Ambient Water Quality Criteria (NAWQC) (33 U.S.G. §1314(a) and 42 U.S.C. §9621(D)(2) AND Water Quality Standards (40 CFR §131.36(b) and 131.38)	<b>Relevant and Appropriate</b>	NAWQC and water quality standards are intended to protect human health and aquatic life from contamination in surface water.	Although the NAWQC are non-enforceable guidelines, they may be potentially relevant and appropriate for groundwater in the absence of promulgated MCLs or MCLGs. Water quality standards are relevant and appropriate in case the Site groundwater discharges to surface water or where the discharge alternative for treated groundwater is to surface water.
<b>State Regulatory Requirements</b>	Missouri Water Quality Standards (10 CSR 20-7.031)	<b>Applicable</b>	Identifies beneficial uses of water to the state, criteria to protect those uses, and defines the anti-degradation policy.	Applicable to all waters of the state.
	Public Drinking Water Program Maximum Volatile Organic Chemical Contaminant Levels and Monitoring Requirements (10 CSR 0-4.100)	<b>Applicable</b>	State MCLs have been promulgated for a number of common organic contaminants to regulate the concentration of contaminants in public drinking water supply systems. The regulations are generally equivalent to the Federal SDWA MCLs. State MCLs are applicable for Site groundwater because groundwater in the vicinity is a potential drinking water supply	State MCLs are employed to develop TCLs for the Site groundwater, in those cases where they are stricter than federal standards.
	Clean-up Levels for Missouri (CALM) – Appendix B (Tier 1 Soil and Groundwater Cleanup Standards)	<b>Relevant and Appropriate</b>	Establishes conservatively-derived, risk-based Groundwater Target Concentrations (GTARC) for remediation of voluntary cleanup sites in Missouri.	Although GTARC are non-enforceable guidelines, they may be relevant and appropriate for groundwater in the absence of promulgated MCLs.
<b>Guidance</b>	U.S. Environmental Protection Agency (EPA) Risk Reference Doses (RfDs)	<b>To Be Considered</b>	RfDs are does levels developed by EPA for evaluating incremental human carcinogenic risk from exposure to carcinogens	RfDs are used to evaluate human health risks from exposure to non-carcinogenic Site contaminants.
	EPA Human Health Assessment Cancer Slope Factors (CSFs)	<b>To Be Considered</b>	CSFs are developed for evaluating incremental human carcinogenic risk from exposure to carcinogens.	CSFs are used to evaluate cancer risk resulting from exposure to carcinogenic Site COCs.
	EPA Health Advisories, Human Health Risk Assessment Guidance and Ecological Risk Assessment Guidance	<b>To Be Considered</b>	These guidance documents and advisories establish criteria and provide guidelines for evaluating human health and ecological risks at CERCLA sites.	These guidance documents and advisories are used to evaluate human health and ecological risk due Site COCs.

**2005 Record of Decision**  
**Potential Location Specific ARARs and TBCs**

Authority	Requirement	Status	Synopsis of Requirement	Consideration in the FS
<b>Federal Regulatory Requirements</b>	Protection of Wetlands (Executive Order 11990, 40 CFR Part 6, Appendix A)	<b>Applicable</b>	Requires federal agencies to minimize the destruction, loss, or degradation of wetlands; preserve and enhance the natural and beneficial value of wetlands; and avoid support of new construction in wetlands if a practicable alternative exists.	The U.S. Army Corps of Engineers has identified a jurisdictional wetland down-gradient of the Site.
	Floodplain Management (Executive Order 11988, 40 CFR 6.302(b) and 40 CFR Part 6, Appendix A)	<b>Applicable</b>	Requires federal agencies to evaluate the potential effects of an action they may take in a floodplain to avoid, to the extent possible, adverse effects associated with direct and indirect development of a floodplain.	The potential effects on the Cape La Croix Creek will be considered during the development and evaluation of remedial alternatives. All practicable measures will be taken to limit adverse effects on floodplains.
	Resource Conservation and Recovery Act (RCRA) Floodplain Restriction for Hazardous Facilities (40 CFR 264.18(b))	<b>Applicable</b>	A hazardous waste facility located in a 100-year floodplain must be designed, constructed, operated, and maintained to prevent wash-out of any hazardous waste by a 100-year flood, unless the owner or operator can demonstrate that procedures are in effect that will cause the waste to be removed safely before the flood can reach the facility.	If remedial alternatives are developed which include hazardous waste facilities in the floodplain at the Site, then the facilities will need to comply with these requirements.
<b>State Regulatory Requirements</b>	Protection of Lakes and Streams Missouri Water Quality Standards (10 CSR 20-7.03)	<b>Applicable</b>	Promulgates rules to protect quality of lakes and streams. Beneficial uses of Cape La Croix Creek are designated as livestock and wildlife watering and protection of warm water and aquatic life and human health (fish consumption).	Chemical specific ARARs are identified in Table B-1.

**2005 Record of Decision  
Potential Action-Specific ARARs and TBCs**

<b>Authority</b>	<b>Requirement</b>	<b>Status</b>	<b>Synopsis of Requirement</b>	<b>Consideration in the FS</b>
<b>Federal Regulatory Requirements</b>	Standards Applicable to Transporters of Hazardous Waste (40 CFR Part 263)	<b>Applicable</b>	Establishes standards which apply to persons transporting hazardous waste within the United States if the transportation requires a manifest pursuant to 40 CFR part 262.	If alternative involves offsite transportation of hazardous materials.
	Safe Drinking Water Act (SDWA) – §1412(b)(4)(E)(ii)	<b>Applicable</b>	Regulates the design, management, and operation of point of use (POU) or point of entry (POE) treatment units used to achieve compliance with a MCL.	If individual wellhead treatment units are required, these units will need to comply.
	Safe Drinking Water Act -- Criteria and procedures for public water systems using point of entry devices (40 CFR §141.100)	<b>Applicable</b>	Establishes criteria and procedures for Public Water Systems using POE devices.	If water supply wells are installed in the area which require wellhead treatment.
	Safe Drinking Water Act -- Variances and exemptions from the maximum contaminant levels for organic and inorganic chemicals (40 CFR §142.60)	<b>Applicable</b>	Identifies technologies and treatment techniques or other means available to achieve compliance with MCLs.	If wellhead treatment becomes necessary, then the system best available technologies will be needed to attain MCLs.

## **ATTACHMENT 4**

### **Groundwater Monitoring Data**

**Table A-1 – Quarterly Comparison of Groundwater Concentrations**

**Contaminant: 1,1,1 TCA**

**MCL: 200 ppb**

Well No.	Concentration in ppb												
	04/2001	07/2001	10/2001	01/2001	05/2002	08/2002	10/2002	02/2003	05/2003	08/2003	10/2003	02/2004	11/2004
3	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
4	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
6A	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0			<5.0
7	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
9	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0			<5.0
10	8.0	5.6	6.6	<5.0	6.0	<5.0	5.3	4J	5.0	<5.0	<5.0	3J	1.8J
11	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
11A	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
WSW	<5.0	<5.0	<5.0	<5.0	--	--	2J	<5.0	<5.0	<5.0	<5.0	<5.0	2J
12	These wells were installed during late November -early December 2002. They were first sampled on December 11, 2002. 1,1,1-TCA concentrations were less than 5.0 ppb.							<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
13								<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
14								<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
15A	These wells were installed during late August to early September 2003. They were first sampled September 15 or 16, 2003. 1,1,1-TCA concentrations were <5.0 ppb.										<5.0	<5.0	<5.0
15B											<5.0	<5.0	<5.0
16A											<5.0	<5.0	<5.0
16B											<5.0	<5.0	<5.0
16C											<5.0	<5.0	<5.0
17A											<5.0	<5.0	<5.0
17B											<5.0	<5.0	<5.0
18											<5.0	<5.0	<5.0
20A	These wells were installed during April 2004. They were first sampled April 19 or 20, 2004. 1,1,1-TCA concentrations were <5.0 ppb.												<5.0
20B													<5.0
20C													<5.0
21A													<5.0
21B													<5.0



**MCL: 5 ppb**

[illegible]

**MCL: 5 ppb**

Well No.	Concentration in ppb												
	04/2001	07/2001	10/2001	01/2001	05/2002	08/2002	10/2002	02/2003	05/2003	08/2003	10/2003	02/2004	11/2004
3	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
4	<5.0	<5.0	<5.0	<5.0	3J	8.6	2.4	2J	<5.0	4J	5J	<5.0	2.6J
5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
6A	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0			<5.0
7	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
9	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	1J			
10	<5.0	<5.0	<5.0	<5.0	3J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
11	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
11A	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
WSW	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	--	<5.0	<5.0	<5.0	<5.0
12	These wells were installed during late November -early December 2002. They were first sampled on December 11, 2002. PCE concentrations were less than 5.0 ppb.							<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
13								<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
14								<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
15A	These wells were installed during late August to early September 2003. They were first sampled September 15 or 16, 2003. PCE concentrations were <5.0 ppb.										<5.0	<5.0	<5.0
15B											<5.0	<5.0	<5.0
16A											<5.0	<5.0	<5.0
16B											<5.0	<5.0	<5.0
16C											<5.0	<5.0	<5.0
17A											<5.0	<5.0	<5.0
17B											<5.0	<5.0	<5.0
18											<5.0	<5.0	<5.0
20A	These wells were installed during April 2004. They were first sampled April 19 or 20, 2004. PCE concentrations were <5.0 ppb.												<5.0
20B													<5.0
20C													<5.0
21A													<5.0
21B													<5.0

**MCL: –**

[illegible]

**Contaminant: 1,1-DCE**

Well No.	Concentration in ppb													
	04/2001	07/2001	10/2001	01/2001	05/2002	08/2002	10/2002	02/2003	05/2003	08/2003	10/2003	02/2004	11/2004	
3	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	
4	7.7	<5.0	<5.0	6.4	9.9	6.1	2.2	7.0	<5.0	5.2	5.1	9.8	6.9	
5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	
6A	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0				
7	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	
9	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0				
10	7.0	<5.0	6.8	7.8	10	8.9	9.0	7.6	5J	4J	4J	4J	3.8J	
11	<5.0	<5.0	<5.0	<5.0	4J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	
11A	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	
WSW	<5.0	<5.0	<5.0	<5.0			2J			4J	4J	3J	3.6J	
12	These wells were installed during late November -early December 2002. They were first sampled on December 11, 2002. 1,1-DCE concentrations were less than 5.0 ppb.							<5.0	<5.0	<5.0	2J	<5.0	<5.0	
13								<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	
14								<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	
15A	These wells were installed during late August to early September 2003. They were first sampled September 15 or 16, 2003. 1,1-DCE concentrations were <5.0 ppb with the exception of MW-16B which had "J" coded data (1J).										<5.0	<5.0	<5.0	
15B											<5.0	<5.0	<5.0	
16A											<5.0	<5.0	<5.0	
16B											<5.0	1J	1.6J	
16C											<5.0	2J	1.3J	
17A											<5.0	<5.0	<5.0	
17B											<5.0	<5.0	<5.0	
18											<5.0	<5.0	<5.0	
20A	These wells were installed during April 2004. They were first sampled April 19 or 20, 2004. 1,1-DCE concentrations were <5.0 ppb.													<5.0
20B														<5.0
20C														<5.0
21A														<5.0
21B														<5.0

**Contaminant: 1,2-DCE**

[illegible]

### Contaminant: Benzene

Well No.	Concentration in ppb												
	04/2001	07/2001	10/2001	01/2001	05/2002	08/2002	10/2002	02/2003	05/2003	08/2003	10/2003	02/2004	11/2004
3	5.3	5.6	16	14	17	11	9.0	9.6	7.3	8.0	11	8.8	4.7J
4	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
5	<5.0	<5.0	<5.0	<5.0	<5.0	3J	2J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
6A	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0			
7	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
9	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0			
10	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
11	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
11A	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
WSW	<5.0	<5.0	<5.0	<5.0			<5.0			<5.0	<5.0	<5.0	<5.0
12	These wells were installed during late November -early December 2002. They were first sampled on December 11, 2002. Benzene concentrations were less than 5.0 ppb with the exception of MW-12 which had a concentration of 26 ppb.							30	19	51	42	54	83
13								<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
14								<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
15A	These wells were installed during late August to early September 2003. They were first sampled September 15 or 16, 2003. Benzene concentrations were <5.0 ppb.										<5.0	<5.0	<5.0
15B											<5.0	<5.0	<5.0
16A											<5.0	<5.0	<5.0
16B											<5.0	<5.0	1.7J
16C											<5.0	<5.0	<5.0
17A											<5.0	<5.0	<5.0
17B											<5.0	<5.0	<5.0
18											<5.0	<5.0	<5.0
20A	These wells were installed during April 2004. They were first sampled April 19 or 20, 2004. Benzene concentrations were <5.0 ppb.											<5.0	
20B												<5.0	
20C												<5.0	
21A												<5.0	
21B													

**MCL: 20 ppb**

[illegible]

**MCL: 70 ppb**

Well No.	Concentration in ppb																				
	04/2001	07/2001	10/2001	01/2001	05/2002	08/2002	10/2002	02/2003	05/2003	08/2003	10/2003	02/2004	11/2004								
3	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10								
4	41	<10	18	16	30	30	<10	20	22	8J	6J	45	21								
5	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10								
6A	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10											
7	24	<10	<10	<10	16	28	8J	15	51	62	16	13	25								
9	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10											
10	31	31	28	18	10	13	12	9J	7J	4J	4J	3J	<10								
11	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10								
11A	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10								
WSW	<10	<10	<10	<10			<10			<10	<10	<10	<10								
12	These wells were installed during late November -early December 2002. They were first sampled on December 11, 2002. 1,2,4-TCB concentrations were less than 10 ppb with the exception of MW-12 which had a concentration of 30 ppb.							26	<10	16	16	11	14								
13								<10	<10	<10	<10	<10	<10								
14								<10	<10	<10	2J	2J	5.5J								
15A	These wells were installed during late August to early September 2003. They were first sampled September 15 or 16, 2003. 1,2,4-TCB concentrations were <10 ppb.										<10	<10	<10								
15B											<10	<10	<10								
16A											<10	<10	<10								
16B											<10	<10	<10								
16C											2J	<10	<10								
17A											<10	<10	<10								
17B											<10	<10	<10								
18	These wells were installed during April 2004. They were first sampled April 19 or 20, 2004. 1,2,4-TCB concentrations were <10 ppb.										<10	<10	<10								
20A																					<10
20B																					<10
20C																					<10
21A																					<10
21B											<10										



**Contaminant: 1,2-DCB**

[illegible]

**Contaminant: 1,3-DCB**

[illegible]

**Contaminant: 1,4-DCB**

[illegible]

**Contaminant: PCB (Aroclor 1260 unfiltered)**

[illegible]

**MCL: -**

[illegible]

## **ATTACHMENT 5**

### **Five Year Review Fact Sheet**



## Region 7

Iowa  
Kansas  
Missouri  
Nebraska  
Nine Tribal Nations

## Fact Sheet

February 2009

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### **Second Five-Year Review Begins Missouri Electric Works Superfund Site Cape Girardeau, Cape Girardeau County, Missouri**

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#### **Introduction**

The U.S. Environmental Protection Agency (EPA) conducts regular five-year checkups, called five-year reviews, on Superfund sites where cleanups have been completed. These regular five-year reviews are required by the Superfund law [42 U.S.C. Section 9621(c)] to make sure the site remains the same and the cleanup actions continue to protect public health and the environment.

Before remedial actions began, the site posed a potential threat to public health through:

- direct contact with contaminated soils or building surfaces and
- the potential migration of polychlorinated biphenyls (PCBs) and chlorobenzenes into the surrounding ground water.

#### **Background**

Missouri Electric Works, Inc. (MEW) operated a motor and transformer salvage, repair, and sales operation at the site from 1954 until 1992. PCB contaminated oils and other fluids from

the transformers being recycled, were disposed on site.

EPA discovered the PCB contamination of site soils in 1984. Investigation into the nature and extent of the soil contamination between 1984 and 1990 led to the discovery of the ground water contamination. In 1988, MEW was ordered to stop accepting oil-filled equipment with PCB contamination and to install barriers that would stop PCBs moving from the site by way of storm water runoff.

In 1988, a group of potentially responsible parties (PRPs), acting under an Administrative Order on Consent (AOC), performed the final soil investigations. A high PCB level in the soil was confirmed. PCBs and chlorobenzene were later detected in the ground water.

A 1990 Record of Decision (ROD), followed by an Explanation of Significant Differences in 1995, allowed for the on-site thermal treatment of contaminated soils (including both thermal destruction and thermal desorption). Another ROD completed in 1995, included a Technical Impracticability Waiver addressing the deep migration of PCBs and solvents in bedrock ground water which cannot

feasibly be remediated. The soil cleanup began in 1999 and was completed in 2000. The Ground Water Remedial Investigation/Feasibility Study was completed in 2004 and the long-term monitoring continues.

Additional assessment of the wetlands area and the risks to its animal and plant life is ongoing. Human exposure was addressed in the wetlands area in 2007, with the construction of a fence to prevent access and the posting of warning signs in response to the detection of PCBs in all the fish sampled.

### **First Five-Year Review**

The First Five-Year Review in 2004 concluded the soil remedy is protective of human health and the environment. Additional recommendations were made to continue ground water monitoring to determine plume migration and if natural attenuation is occurring, investigate the wetlands and conduct additional risk assessment of the ecological impacts to assure future protectiveness of and address additional corrective action needs.

### **This Five-Year Review**

During the five-year review, EPA and MDNR will inspect the site and study site information to make sure the soil remedy continues to be protective of human health and the environment. We encourage the community to tell us about site conditions or concerns you may have.

At the end of the review, a final report will be prepared and will be available in the site information repositories.

### **Additional Information**

Detailed site information can be found in the Missouri Electric Works Administrative Record, at the following locations, during normal business hours:

**Cape Girardeau Public Library**  
711 N. Clark St.  
Cape Girardeau, Mo.

**EPA Records Center**  
901 N. Fifth St.  
Kansas City, Kan.

Questions or requests for information can be submitted to:

**Fritz Hirter**  
Community Involvement Coordinator  
U.S. EPA Region 7  
901 N. Fifth St.  
Kansas City, KS 66101  
Toll free: (800) 223-0425  
E-mail: [hirter.fritz@epa.gov](mailto:hirter.fritz@epa.gov)



**ATTACHMENT 6**

**PUBLIC NOTICE**



**U.S. Environmental Protection Agency (EPA) Region 7  
and  
Missouri Department of Natural Resources (MDNR)  
to conduct the  
Second Five-Year Review for the  
Missouri Electric Works Superfund Site  
Cape Girardeau, Cape Girardeau County, Missouri**

EPA and MDNR will conduct the second Five-Year Review at the Missouri Electric Works Superfund Site. The review is required by the Superfund law to make sure the cleanup continues to protect human health and the environment.

The Administrative Record is available at the following locations during normal business hours:

**Cape Girardeau Public Library**  
711 N. Clark St.  
Cape Girardeau, Missouri

**EPA Region 7 Records Center**  
901 N. Fifth St.  
Kansas City, Kansas

Comments or questions about the site can be addressed to:

**Fritz Hirter**  
Community Involvement Coordinator  
EPA Region 7 -- 901 N. Fifth St.  
Kansas City, KS 66101  
Toll free: (800) 223-0425  
e-mail: [hirter.fritz@epa.gov](mailto:hirter.fritz@epa.gov)

**ATTACHMENT 7**

**INTERVIEW DOCUMENTATION FORM**

### INTERVIEW DOCUMENTATION FORM

The following is a list of individual interviewed for this five-year review. See the attached contact record(s) for a detailed summary of the interviews.

C.J. Morrill

Name

Property Owner

Title/Position

Contrend, Inc.

Organization

2/11/09 & 4/13/09

Dates

Donald F Van Dyke

Name

Project Manager

Title/Position

MDNR

Organization

3/28/2009

Date

### INTERVIEW RECORD

<b>Site Name:</b> Missouri Electric Works		<b>EPA ID No.:</b> MOD980965982	
<b>Subject:</b> Site Issues or Concerns for Five Year Review		<b>Time:</b>	<b>Date:</b> 2/11/2009 & 04/13/2009
<b>Type:</b> <input checked="" type="checkbox"/> Telephone <input checked="" type="checkbox"/> Visit <input type="checkbox"/> Other <b>Location of Visit:</b> Contrend, Inc. (near site)		<input type="checkbox"/> Incoming <input checked="" type="checkbox"/> Outgoing	
<b>Contact Made By:</b>			
<b>Name:</b> Dan Kellerman		<b>Title:</b> RPM	<b>Organization:</b> EPA
<b>Individual Contacted:</b>			
<b>Name:</b> C.J. Morrill		<b>Title:</b> Property Owner	<b>Organization:</b> Contrend, Inc.
<b>Telephone No:</b> 573-334-48328 <b>Fax No:</b> 573-334-4936 <b>E-Mail Address:</b> cjmorrill@contrendinc.com		<b>Street Address:</b> 840 S. Kingshighway <b>City, State, Zip:</b> Cape Girardeau, MO 63703	
<b>Summary Of Conversation</b>			
Mr. Morrill did not have any concerns regarding the site. He expressed interest in getting some of the monitor wells on the Property plugged in an effort to make the site more useable. He plans to either redevelop the site and/or market the property.			

## INTERVIEW RECORD

<b>Site Name: Missouri Electric Works</b>		<b>EPA ID No.: MOD980965982</b>	
<b>Subject: Site Issues or Concerns for Five Year Review</b>		<b>Time:</b>	<b>Date: 03/28/2009</b>
<b>Type:</b> Telephone <input checked="" type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
<b>Location of Visit: Missouri Electric Works Site</b>			
<b>Contact Made By:</b>			
<b>Name: Dan Kellerman</b>		<b>Title: RPM</b>	<b>Organization: EPA</b>
<b>Individual Contacted:</b>			
<b>Name: Don Van Dyke</b>		<b>Title: Project Manager</b>	<b>Organization: MDNR</b>
<b>Telephone No: 573-751-3176</b>		<b>Street Address: P.O. Box 176</b>	
<b>Fax No: 573-751-7869</b>		<b>City, State, Zip: Jefferson City, MO 65102-0176</b>	
<b>E-Mail Address: don.van.dyke@dnr.mo.gov</b>			
<b>Summary Of Conversation</b>			
<p>Mr. Van Dyke expressed the following concerns:</p> <ul style="list-style-type: none"><li>-Original surface of the filled areas in the wetland is approximately 4' below the current surface elevation and was not sampled prior to unauthorized filling by the current landowner;</li><li>-The location of a buried creek channel, suspected to be a migration pathway for source contamination in communication with the alluvial aquifer, was not identified during prior assessment activities.</li><li>-Silt/sediment was extracted from the channel of the storm-water ditch by the City of Cape Girardeau alongside Wilson Road and was placed on the bank; the ditch previously revealed a presence of PCBs.</li></ul>			

**ATTACHMENT 8**

**SITE INSPECTION REPORT**

## Site Inspection Checklist

I. SITE INFORMATION	
Site name: Missouri Electric Works x	Dates of inspection: 02/11/2009 & 03/28/2009
Location and Region: Missouri, Region 7	EPA ID: MOD980965982
Agency, office, or company leading the five-year review: EPA- SUPR - SPEB	Weather/temperature: Overcast, rain, 50's (02/11/2009); Sunny, 70's (3/28/2009)
<b>Remedy Includes:</b> (Check all that apply) <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div style="width: 45%;"> <input type="checkbox"/> Landfill cover/containment  <input type="checkbox"/> Access controls  <input checked="" type="checkbox"/> Institutional controls  <input type="checkbox"/> Groundwater pump and treatment  <input type="checkbox"/> Surface water collection and treatment  <input checked="" type="checkbox"/> Other Soil removal, treatment, vegetative cover, technical impracticability waiver, enhanced bio-degradation             </div> <div style="width: 45%;"> <input checked="" type="checkbox"/> Monitored natural attenuation  <input type="checkbox"/> Groundwater containment  <input type="checkbox"/> Vertical barrier walls             </div> </div>	
<b>Attachments:</b> <input type="checkbox"/> Inspection team roster <input checked="" type="checkbox"/> Site map attached	
II. INTERVIEWS (Check all that apply)	
<b>1. O&amp;M site manager</b> <u>see below comment</u> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div style="width: 40%;">Name _____</div> <div style="width: 20%;">Title _____</div> <div style="width: 20%;">Date _____</div> </div> Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone   Phone no. _____ Problems, suggestions; <input type="checkbox"/> Report attached  <b>O&amp;M currently not implemented, CD under negotiation</b>	
<b>2. O&amp;M staff</b> _____ <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div style="width: 40%;">Name _____</div> <div style="width: 20%;">Title _____</div> <div style="width: 20%;">Date _____</div> </div> Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone   Phone no. _____ Problems, suggestions; <input type="checkbox"/> Report attached  <b>Currently no O&amp;M staff, CD under negotiation</b>	
<b>3. Local regulatory authorities and response agencies</b> (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.  <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 15%;">Agency</div> <div style="width: 40%;">Missouri Dept. Natural Resources</div> <div style="width: 15%;">Contact</div> <div style="width: 20%;">Don Van Dyke    Project Manager</div> <div style="width: 10%;">03/24/2008</div> <div style="width: 15%;">573-334-4828</div> </div> Problems; suggestions; <input checked="" type="checkbox"/> Report attached <b>see interview form</b>	
<b>4. Other interviews (optional)</b> <input checked="" type="checkbox"/> Report attached.	

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)				
1.	<b>O&amp;M Documents</b> <input type="checkbox"/> O&M manual <input type="checkbox"/> As-built drawings <input type="checkbox"/> Maintenance logs	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date	x N/A x N/A x N/A
Remarks: <u>Administrative documents are available at Cape Girardeau Public Library</u>				
2.	<b>Site-Specific Health and Safety Plan</b> <input type="checkbox"/> Contingency plan/emergency response plan	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date	<input type="checkbox"/> N/A <input type="checkbox"/> N/A
Remarks: <u>There is currently no occupied location on the Property for records</u>				
3.	<b>O&amp;M and OSHA Training Records</b>	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	x N/A
Remarks: <u>There is currently no occupied location on the Property for records</u>				
4.	<b>Permits and Service Agreements</b> <input type="checkbox"/> Air discharge permit <input type="checkbox"/> Effluent discharge <input type="checkbox"/> Waste disposal, POTW <input type="checkbox"/> Other permits	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date	x N/A x N/A x N/A <input type="checkbox"/> N/A
Remarks: _____				
5.	<b>Gas Generation Records</b>	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	x N/A
Remarks: _____				
6.	<b>Settlement Monument Records</b>	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	x N/A
Remarks: _____				
7.	<b>Groundwater Monitoring Records</b>	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: <u>Groundwater Monitoring records available upon FOIA request to EPA</u>				
8.	<b>Leachate Extraction Records</b>	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	x N/A
Remarks: _____				
9.	<b>Discharge Compliance Records</b> <input type="checkbox"/> Air <input type="checkbox"/> Water (effluent)	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date	x N/A x N/A
Remarks: _____				
10.	<b>Daily Access/Security Logs</b>	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	x N/A
Remarks: _____				



#### IV. O&M COSTS

**1. O&M Organization**

- ☐ State in-house                      ☐ Contractor for State  
☐ PRP in-house                      ☒ Contractor for PRP  
☐ Federal Facility in-house           ☐ Contractor for Federal Facility  
☐ Other \_\_\_\_\_

**2. O&M Cost Records**

- ☐ Readily available           ☐ Up to date  
☐ Funding mechanism/agreement in place  
 Original O&M cost estimate \_\_\_\_\_ ☐ Breakdown attached

Total annual cost by year for review period if available

From _____	To _____				<input type="checkbox"/> Breakdown attached
Date	Date	Total cost			
From _____	To _____				<input type="checkbox"/> Breakdown attached
Date	Date	Total cost			
From _____	To _____				<input type="checkbox"/> Breakdown attached
Date	Date	Total cost			
From _____	To _____				<input type="checkbox"/> Breakdown attached
Date	Date	Total cost			
From _____	To _____				<input type="checkbox"/> Breakdown attached
Date	Date	Total cost			

**3. Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

#### V. ACCESS AND INSTITUTIONAL CONTROLS    x Applicable    ☐ N/A

**A. Fencing**

**1. Fencing damaged**                      ☐ Location shown on site map           ☐ Gates secured                      ☐ N/A

Remarks: Fence secure but small trees have fallen across top on west side

**B. Other Access Restrictions**

**1. Signs and other security measures**                      ☐ Location shown on site map           ☐ N/A

Remarks: Signage present and visible on fence "No Trespassing, Fishing or Hunting"

<b>C. Institutional Controls (ICs)</b>			
1.	<b>Implementation and enforcement</b> Site conditions imply ICs not properly implemented Site conditions imply ICs not being fully enforced  Type of monitoring (e.g., self-reporting, drive by) PRP reporting Frequency: <u>currently under CD negotiation</u> Responsible party/agency: <u>Missouri Electric Works Site Contributors</u> Contact: <u>Warren Mueller</u> <u>Chairman</u> <div style="display: flex; justify-content: space-between; width: 100%;"> <span>Name</span> <span>Title</span> <span>Date</span> <span>Phone no.</span> </div>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
	Reporting is up-to-date Reports are verified by the lead agency  Specific requirements in deed or decision documents have been met Violations have been reported Other problems or suggestions: <input type="checkbox"/> Report attached	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
<b>OU 1 requirement met; OU 2 requirements under negotiation; OU 3 remedy not selected</b>			
2.	<b>Adequacy</b> <input type="checkbox"/> ICs are adequate <input type="checkbox"/> ICs are inadequate <input type="checkbox"/> N/A Remarks: <u>ICs are pending implementation</u>		
<b>D. General</b>			
1.	<b>Vandalism/trespassing</b> <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> No vandalism evident Remarks: <u>Isolated dumping of brush/debris reported by owner/owner representative</u>		
2.	<b>Land use changes on site</b> <input checked="" type="checkbox"/> N/A Remarks: _____		
3.	<b>Land use changes off site</b> <input type="checkbox"/> N/A Remarks: <u>Some commercial development surrounding site along Wilson Road</u>		
<b>VI. GENERAL SITE CONDITIONS</b>			
<b>A. Roads</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A			
1.	<b>Roads damaged</b> <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Roads adequate <input type="checkbox"/> N/A Remarks: _____		

<b>B. Other Site Conditions</b>			
Remarks: <u>Road to wetlands area in need of mowing/vegetation removal</u>			
<b>VII. LANDFILL COVERS</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A			
<b>A. Landfill Surface (refers to vegetative cover in location of soil removal and fill)</b>			
1.	<b>Settlement</b> (Low spots) Areal extent _____ Remarks _____	<input type="checkbox"/> Location shown on site map Depth _____	<input checked="" type="checkbox"/> Settlement not evident
2.	<b>Cracks</b> Lengths _____ Widths _____ Depths _____ Remarks _____	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Cracking not evident
3.	<b>Erosion</b> Areal extent _____ Remarks: <u>Erosion reported alongside rock-filled gabions in 2004 FYR has not apparently progressed to a condition of disrepair or in need of immediate attention</u>	<input type="checkbox"/> Location shown on site map Depth _____	<input checked="" type="checkbox"/> Erosion not evident
4.	<b>Holes</b> Areal extent _____ Remarks _____	<input type="checkbox"/> Location shown on site map Depth _____	<input checked="" type="checkbox"/> Holes not evident
5.	<b>Vegetative Cover</b> <input checked="" type="checkbox"/> Trees/Shrubs Remarks: Trees are growing in location of wells, should be removed to prevent damage to casings	<input checked="" type="checkbox"/> Grass <input checked="" type="checkbox"/> Cover properly established	<input checked="" type="checkbox"/> No signs of stress
6.	<b>Alternative Cover (armored rock, concrete, etc.)</b> <input type="checkbox"/> N/A Remarks: <u>Rock-filled gabions in drainage areas on east side of site reveal some minor washing from heavy precipitation, slight erosion alongside gabions</u>		
7.	<b>Bulges</b> Areal extent _____ Remarks _____	<input type="checkbox"/> Location shown on site map Height _____	<input checked="" type="checkbox"/> Bulges not evident
8.	<b>Wet Areas/Water Damage</b> <input type="checkbox"/> Wet areas <input type="checkbox"/> Ponding <input type="checkbox"/> Seeps <input type="checkbox"/> Soft subgrade Remarks _____	<input checked="" type="checkbox"/> Wet areas/water damage not evident <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Location shown on site map	Areal extent _____ Areal extent _____ Areal extent _____ Areal extent _____

9.	<b>Slope Instability</b>	<input type="checkbox"/> Slides	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No evidence of slope instability
	Areal extent _____			
	Remarks _____			
<b>B. Benches</b> <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A (Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)				
1.	<b>Flows Bypass Bench</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> N/A or okay	
	Remarks _____			
2.	<b>Bench Breached</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> N/A or okay	
	Remarks _____			
3.	<b>Bench Overtopped</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> N/A or okay	
	Remarks _____			
<b>C. Letdown Channels</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A (Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)				
1.	<b>Settlement</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No evidence of settlement	
	Areal extent _____	Depth _____		
	Remarks _____			
2.	<b>Material Degradation</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No evidence of degradation	
	Material type _____	Areal extent _____		
	Remarks _____			
3.	<b>Erosion</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of erosion	
	Areal extent _____	Depth _____		
	Remarks: <u>Slight erosion alongside rock-filled gabions on east side of property</u>			

4.	<b>Undercutting</b> Areal extent _____ Depth _____ Remarks _____	<input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> No evidence of undercutting
5.	<b>Obstructions</b> Type _____ <input type="checkbox"/> Location shown on site map     Areal extent _____ Size _____ Remarks _____	<input checked="" type="checkbox"/> No obstructions
6.	<b>Excessive Vegetative Growth</b> Type _____ <input type="checkbox"/> No evidence of excessive growth <input checked="" type="checkbox"/> Vegetation in channels does not obstruct flow <input type="checkbox"/> Location shown on site map     Areal extent _____ Remarks _____	
<b>D. Cover Penetrations</b> <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A		
1.	<b>Gas Vents</b> <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> N/A Remarks _____	<input type="checkbox"/> Active <input type="checkbox"/> Passive <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance
2.	<b>Gas Monitoring Probes</b> <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Evidence of leakage at penetration Remarks _____	<input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A
3.	<b>Monitoring Wells</b> (within surface area of landfill) <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Evidence of leakage at penetration Remarks _____	<input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A
4.	<b>Leachate Extraction Wells</b> <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Evidence of leakage at penetration Remarks _____	<input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A
5.	<b>Settlement Monuments</b> Remarks _____	<input type="checkbox"/> Located <input type="checkbox"/> Routinely surveyed <input type="checkbox"/> N/A

<b>E. Gas Collection and Treatment</b>			<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	<b>Gas Treatment Facilities</b> <input type="checkbox"/> Flaring <input type="checkbox"/> Thermal destruction <input type="checkbox"/> Collection for reuse <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____			
2.	<b>Gas Collection Wells, Manifolds and Piping</b> <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____			
3.	<b>Gas Monitoring Facilities</b> (e.g., gas monitoring of adjacent homes or buildings) <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A Remarks _____			
<b>F. Cover Drainage Layer</b>			<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	<b>Outlet Pipes Inspected</b> <input type="checkbox"/> Functioning <input type="checkbox"/> N/A Remarks _____			
2.	<b>Outlet Rock Inspected</b> <input checked="" type="checkbox"/> Functioning <input type="checkbox"/> N/A Remarks _____			
<b>G. Detention/Sedimentation Ponds</b>			<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	<b>Siltation</b> Areal extent _____ Depth _____ <input type="checkbox"/> N/A <input type="checkbox"/> Siltation not evident Remarks _____			
2.	<b>Erosion</b> Areal extent _____ Depth _____ <input type="checkbox"/> Erosion not evident Remarks _____			
3.	<b>Outlet Works</b> <input type="checkbox"/> Functioning <input type="checkbox"/> N/A Remarks _____			
4.	<b>Dam</b> <input type="checkbox"/> Functioning <input type="checkbox"/> N/A Remarks _____			

<b>H. Retaining Walls</b>		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	<b>Deformations</b> Horizontal displacement _____ Rotational displacement _____ Remarks _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Deformation not evident
2.	<b>Degradation</b> Remarks _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Degradation not evident
<b>I. Perimeter Ditches/Off-Site Discharge</b>		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	<b>Siltation</b> Areal extent _____ Depth _____ Remarks _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Siltation not evident
2.	<b>Vegetative Growth</b> <input type="checkbox"/> Vegetation does not impede flow Areal extent _____ Type _____ Remarks _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A
3.	<b>Erosion</b> Areal extent _____ Depth _____ Remarks _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Erosion not evident
4.	<b>Discharge Structure</b> Remarks _____	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
<b>VIII. VERTICAL BARRIER WALLS</b>			
		<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	<b>Settlement</b> Areal extent _____ Depth _____ Remarks _____	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Settlement not evident
2.	<b>Performance Monitoring</b> Type of monitoring _____ <input type="checkbox"/> Performance not monitored Frequency _____ Head differential _____ Remarks _____		

<b>C. Treatment System</b>		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	<b>Treatment Train</b> (Check components that apply) <input type="checkbox"/> Metals removal <input type="checkbox"/> Oil/water separation <input type="checkbox"/> Bioremediation <input type="checkbox"/> Air stripping <input type="checkbox"/> Carbon adsorbers <input type="checkbox"/> Filters _____ <input type="checkbox"/> Additive (e.g., chelation agent, flocculent) _____ <input type="checkbox"/> Others _____ <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> Sampling ports properly marked and functional <input type="checkbox"/> Sampling/maintenance log displayed and up to date <input type="checkbox"/> Equipment properly identified <input checked="" type="checkbox"/> Quantity of groundwater treated annually _____ <input type="checkbox"/> Quantity of surface water treated annually _____ Remarks _____ _____		
2.	<b>Electrical Enclosures and Panels</b> (properly rated and functional) <input checked="" type="checkbox"/> N/A <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____		
3.	<b>Tanks, Vaults, Storage Vessels</b> <input checked="" type="checkbox"/> N/A <input type="checkbox"/> Good condition <input type="checkbox"/> Proper secondary containment <input type="checkbox"/> Needs Maintenance Remarks _____ _____		
4.	<b>Discharge Structure and Appurtenances</b> <input checked="" type="checkbox"/> N/A <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____ _____		
5.	<b>Treatment Building(s)</b> <input checked="" type="checkbox"/> N/A <input type="checkbox"/> Good condition (esp. roof and doorways) <input type="checkbox"/> Needs repair <input type="checkbox"/> Chemicals and equipment properly stored Remarks _____ _____		
6.	<b>Monitoring Wells</b> (pump and treatment remedy) <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> All required wells located <input type="checkbox"/> Needs Maintenance <input checked="" type="checkbox"/> N/A Remarks _____ _____		
<b>D. Monitoring Data</b>			
1.	Monitoring Data <input type="checkbox"/> Is routinely submitted on time* <input checked="" type="checkbox"/> Is of acceptable quality       * No sampling since June 2005		
2.	Monitoring data suggests: <input checked="" type="checkbox"/> Groundwater plume is effectively contained <input checked="" type="checkbox"/> Contaminant concentrations are declining		



<b>D. Monitored Natural Attenuation</b>			
1.	<b>Monitoring Wells</b> (natural attenuation remedy) <input checked="" type="checkbox"/> Properly secured/locked <input checked="" type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input checked="" type="checkbox"/> All required wells located <input checked="" type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A Remarks: <u>Locks needing replacement; some wells reveal slight damage to protective covers</u>		
<b>X. OTHER REMEDIES</b>			
If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.			
<b>XI. OVERALL OBSERVATIONS</b>			
<b>A.</b>	<b>Implementation of the Remedy</b>		
Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).  Remarks: <u>Soil remedy is functioning as designed; Groundwater remedy not implemented pending completion of negotiations for the CD; Wetlands remedy has not been selected.</u>			
<b>B.</b>	<b>Adequacy of O&amp;M</b>		
Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.  Remarks: <u>Monitoring to resume upon completion of negotiations of CD. Monitored Natural Attenuation will be utilized to measure progress toward meeting RAO's and to monitor plume migration</u>			

<b>C.</b>	<b>Early Indicators of Potential Remedy Problems</b>
Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.	
Remarks: <u>No issues or observations of remedy problems</u>	
<b>D.</b>	<b>Opportunities for Optimization</b>
Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.	
Remarks: <u>Monitoring will be reinstated upon completion of negotiations and issuance of CD. Monitoring tasks will be relatively straight forward, no optimization projected</u>	